



ORDNANCE SUPPLY MANUAL

GEORGE L. LOHRER

Ordnance Supply Manual

George L. Lohrer

Nabu Public Domain Reprints:

You are holding a reproduction of an original work published before 1923 that is in the public domain in the United States of America, and possibly other countries. You may freely copy and distribute this work as no entity (individual or corporate) has a copyright on the body of the work. This book may contain prior copyright references, and library stamps (as most of these works were scanned from library copies). These have been scanned and retained as part of the historical artifact.

This book may have occasional imperfections such as missing or blurred pages, poor pictures, errant marks, etc. that were either part of the original artifact, or were introduced by the scanning process. We believe this work is culturally important, and despite the imperfections, have elected to bring it back into print as part of our continuing commitment to the preservation of printed works worldwide. We appreciate your understanding of the imperfections in the preservation process, and hope you enjoy this valuable book.

ORDNANCE

SUPPLY MANUAL

PREPARED UNDER DIRECTION OF THE
CHIEF OF ORDNANCE, U. S. A.

BY

GEORGE L. LOHRER



WASHINGTON
GOVERNMENT PRINTING OFFICE
1904

ORDNANCE

SUPPLY MANUAL

ISSUED UNDER DIRECTION OF THE

CHIEF OF ORDNANCE U. S. A.

308402

GEORGE F. LORING



1904

GOVERNMENT PRINTING OFFICE

1904

PREFACE.

This work was undertaken by direction of the Chief of Ordnance, with instructions to incorporate in same briefly the latest list of parts of all guns, carriages, small arms, and ordnance material issuable to the service, the component parts of each, supply tables showing in detail the allowance of same, the equipments of all arms of the service, what constitutes the equipments of the various arms of the service, etc. Briefly all the portions of the regulations, orders, circulars, and rulings of this Department and the Secretary of War bearing upon the issue, care, expenditure, etc., of ordnance material and ordnance stores.

In compiling the book valuable suggestions were obtained at the outset from the pamphlet "Regulations, Orders, Decisions, etc., Governing Ordnance Stores, compiled by First Lieut. James A. Ryan, Ninth Cavalry (now captain, Fifteenth Cavalry)."

Much valuable data was also compiled at the various ordnance establishments by the officers of the Ordnance Corps, to whom the author desires to offer his acknowledgments and thanks.

This edition is published in some respects somewhat incomplete, owing to the desire to issue same to the service at the earliest date possible. It has been the desire as far as practicable to publish the price of all materials, but in some instances, where omitted, it was not available and could not be procured in time. In a few instances it has been necessary to omit the list of component parts of some instruments. All these omissions, as well as additional information as to new material adopted for the service and to be issued in the near future, will be supplied in the next edition published, or by supplemental publications in pamphlet form.

The publication has been brought as near as practicable up to date of July 1, 1903, with some few important changes made since to January 1, 1904.

Criticisms and suggestions are cheerfully invited, and it is hoped they will be made freely, as it is the desire to make the next edition as near a complete work of its kind as possible.

NOTE.—Wherever the designation "Fair leather" appears it will be construed as meaning "stuffed russet leather."

Digitized by the Internet Archive
in 2024

- CONTENTS.

	Pages.
CHAPTER I.—List and nomenclature of parts of 8-inch B. L. rifles and carriages. List of spare parts for issue, etc.	1 to 46
II.—List and nomenclature of parts of 10-inch B. L. rifles and carriages. List of spare parts for issue, etc.	47 to 114
III.—List and nomenclature of parts of 12-inch B. L. rifles and carriages. List of spare parts for issue, etc.	115 to 184
IV.—List and nomenclature of parts of 12-inch B. L. mortars and carriages. List of spare parts for issue, etc.	185 to 220
V.—List and nomenclature of parts of 5-inch R. F. gun O. D. and carriage. List of spare parts for issue, etc.	221 to 234
VI.—List and nomenclature of parts of 6-inch R. F. gun O. D. and carriages. List of spare parts for issue, etc.	234 to 258
VII.—4-inch Driggs-Schroeder, 4.72 and 6 inch Armstrong, and 6 and 15 pounder rapid-fire guns and mounts. List of spare parts for issue, etc.	259 to 300
VIII.—Range finders, azimuth instruments, instruments of precision for system of fire control, drawing instruments, material, etc.	301 to 322
IX.—Sights for seacoast, field, mountain, and rapid-fire guns.	323 to 332
X.—Ammunition, fuses and primers, seacoast, field, siege, and mountain guns.	333 to 356
XI.—Miscellaneous implements and equipments for seacoast fortifications, machines, tools, maneuvering material, crusher gauges, targets, allowances of supplies for seacoast posts, etc.	356 to 384
XII.—Submarine mine material.	385 to 392
XIII.—Siege batteries, materials for, etc.	393 to 456
XIV.—Field and mountain artillery material.	457 to 556
XV.—Gatling and automatic guns, spare parts for, etc.	557 to 578
XVI.—Small arms, spare parts, ammunition (service and target practice), targets, target material, etc., for same.	579 to 624
XVII.—Equipments (personal) for all arms of the service. Cleaning materials for, etc.	625 to 644
XVIII.—Packing and transportation (and reveille guns).	645 to 654
XIX.—General provisions of regulations and general orders pertaining to ordnance property, and miscellaneous provisions relating to issue of ordnance material, etc.	655 to 679
List of publications issued by the Chief of Ordnance, U. S. Army.	679 to 682

CHAPTER I.

LIST AND NOMENCLATURE OF PARTS OF 8-INCH B. L. RIFLES AND CARRIAGES.

LIST OF SPARE PARTS FOR ISSUE, ETC.

8-INCH B. L. RIFLE, MODEL 1888.

(Price of rifle, \$12,327.)

INCLUDES GUN PROPER, BREECH MECHANISM, AND SIGHTS, AS PER LIST BELOW.

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock	1	Steel....	In breech	Interchangeable	Block.
Breechblock oil-hole screw.	1	...do....	Top of breechblock..	Not in all blocks; interchangeable.	
Translating stud.....	1	...do....	Fastened to breechblock.	Interchangeable; should not be removed.	
Translating-stud screw.	1	...do....	Fastens stud to breechblock.	Interchangeable	
Rotating-bar screws..	2	...do....	In rear part of breechblock.	To attach bar for rotation in case breechblock sticks.	
Obturator, complete:					
Obturator spindle, complete—					
Obturator spindle..	1	...do....	In breechblock	Interchangeable	Mushroom, spindle; also wrongly called obturator.
Obturator nut.....	1	...do....	On obturator spindle.	.....do.....	Obturator-spindle nut.
Obturator locking nut.	1	...do....	On obturator spindle, rear of obturator nut.	.....do.....	Lock nut.
Vent bushing.....	1	Copper .	In obturator-spindle head.	Interchangeable; can not be properly inserted at fort.	
Firing attachment, complete—					

Experimental attachments are under test; as soon as adopted, list of parts will be furnished for insertion.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Continued.					
Gas-check pad	1	Asbestos and tal- low in canvas.	On obturator spindle.	Interchangeable	Pad, gas check.
Front split ring	1	Steel	On obturator spindle, between head and pad.	.....do	Front exterior split ring.
Rear split ring	1	do	On obturator spindle, between pad and filling-in disk.	.....do	Rear exterior split ring.
Small split ring	1	do .....	.....do .....	.....do	Small interior split ring, spindle split ring.
Filling-in disk	1	do	On obturator spindle, between pad and breechblock.	.....do	Disk.
Dust cover	1	do	Screwed to obturator-spindle nut.	.....do	Dust guard.
Dust-cover screws	3	do	Screw dust cover to obturator-spindle nut.	Not interchangeable.	Dust-guard screws.
Obturator-spindle washer.	{ 2	Bronze { Steel {	{ Between obturator nut and breechblock.	Interchangeable, except rear one (steel), which has rear face flat.	Antifriction washers.
Tray, complete:					
Tray	1	Bronze	Fastened to breech	Interchangeable	Console.
Hinge pin	1	Steel	Holds tray to gun	Interchangeable; fastened in tray by tray back-latch pivot.	
Hinge-pin oil-hole screw.	1	do	In hinge pin	Interchangeable; not in all guns.	
Translating roller	1	do	In tray	Interchangeable.	
Translating crank	1	do	On translating roller.	.....do	
Translating-crank nut.	1	do	Holds translating crank to translating roller.	.....do	
Translating-crank nut pin.	1	do	Holds translating-crank nut on translating roller.	.....do	
Tray-latch, complete—					
Tray-latch body	1	do	Fastened to tray by tray-latch pivot.	Not interchangeable.	
Tray-latch handle, male.	1	do	In tray latch	Interchangeable; issued together.	
Tray-latch handle, female.	1	do .....	.....do		
Tray-latch handle pin.	1	do	Holds two parts of handle together.	Interchangeable	
Tray-latch pivot	1	do	Holds tray latch to tray.	.....do	
Tray-latch pivot washer.	1	do	On tray-latch pivot .....	.....do	
Tray-latch pivot pin.	1	do	In tray-latch pivot .....	.....do	
Tray-spring bolt	1	do	In tray	Interchangeable; used in some guns of this model.	
Tray-spring bolt spring.	1	do	On tray-spring bolt .....	.....do	
Tray-spring bolt	1	do	In tray	Interchangeable; used in all other guns of this model.	
Tray-spring bolt spring.	1	do	On tray-spring bolt .....	.....do	
Tray-spring bolt shoe.	1	do .....	.....do .....	.....do	
Tray-spring bolt shoe screw.	1	do .....	.....do .....	.....do	
Tray lock, complete—					
Tray-lock bolt	1	do	In tray in rear of tray-latch pivot.	Interchangeable; used in some guns of this model; is to be attached to all others.	
Tray-lock lever	1	do	Fastened to tray by tray-lock lever pivot.	.....do	Tray-lock cam.
Tray-lock link	1	do	Connects lever with tray latch.	.....do	
Tray-lock link pin.	1	do	Connects lever and link.	.....do	
Tray-lock lever pivot.	1	do	Holds lever to tray .....	.....do	
Tray-lock pin	1	do	Connects tray latch to link.	.....do	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray—Continued.					
Tray back-latch catch.	1	Steel....	Fastened to tray	Interchangeable	Securing-latch catch. Securing-latch catch screws.
Tray back-latch catch screws.	2	...do....	Fasten tray back-latch catch to tray.	...do	
Rotating crank, complete:					
Rotating-crank body.	1	...do....	Fastened to rotating pinion.	This old form of rotating crank used in some guns.	
Rotating-crank sleeve.	1	Wrought iron.	On spindle of rotating crank.	...do	
Rotating-crank sleeve screw.	1	Steel....	Secures sleeve to spindle.	...do	
Rotating crank	1	...do....	Fastened to rotating pinion.	Interchangeable; this one-piece crank is in a few guns only.	
Rotating crank complete:					
Rotating-crank body.	1	...do....	Attached to rotating pinion.	This form of rotating crank is the latest, and used on some guns of this model; is to be attached to others. Interchangeable.	
Rotating-crank sleeve.	1	Bronze .	On crank spindle ....	...do	
Rotating-crank sleeve washer.	1	Steel ..	In end of crank sleeve.	...do	
Rotating-crank sleeve-washer screw.	1	...do....	Holds sleeve and washer on crank handle.	...do	
Rotating-crank sleeve screw.	1	...do....	Holds washer to sleeve.	...do	
Rotating-crank nut....	1	...do....	Holds rotating crank to rotating pinions.	Interchangeable	
Rotating-crank nut pin.	1	...do....	Holds rotating-crank nut to rotating pinion.	...do	
Rotating pinion.....	1	...do....	In breech plate .....	...do	
Rotating-pinion washer.	1	...do....	On rotating pinion...	...do	
Rotating-pinion bushing.	1	Bronze .	In breech plate .....	...do	
Rotating-pinion bushing screw.	1	Steel ..	.....	...do	
Rotating-crank lock-bolt.	1	...do....	In rotating crank	Interchangeable; this old method of locking is used in only a few guns of this model. Fits old crank.	Rotating-crank catch.
Rotating-crank lock-spring.	1	...do....	...do		
Rotating-crank lock-housing.	1	Bronze .	Screwed into rotating crank.		
Rotating-crank lock-housing screw.	1	Steel ..	Screwed into rotating crank and crank lock housing.		
Rotating-crank lock bolt.	1	...do....	In rotating crank	This new method of locking is used in most guns of this model; fits latest style crank.	Wing nut.
Rotating-crank lock housing.	1	Bronze .	.....	
Rotating-crank lock-housing screw.	1	Steel....	Screwed into rotating crank and crank-lock housing.		
Rotating-crank spring.	1	...do....	In rotating crank		
Rotating-crank lock washer.	1	...do....	...do	Some screwed in and held from turning by 1 spline screw, some held in cylindrical seat by 2 screws.	
Rotating-crank lock handle.	1	Bronze .	...do		
Rotating-crank lock-handle pin.	1	...do....	...do		
Rotating-crank lock-plate, upper.	1	Steel....	In breech plate		
Rotating-crank lock-plate, lower.	1	...do....	...do		
Rotating-crank lower plate spline screws.	Varies	...do....	.....	
Rotating-crank lock-plate screws.	Varies	...do....	.....	
Vent cover.....	1	...do....	In breechblock	Interchangeable	
Vent-cover pivot.....	1	...do....	...do .....	...do	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray back latch:					
Tray back-latch body.	1	Steel....	Fastened to breech ..	Interchangeable	Securing latch body.
Tray back-latch handle.	1	...do	Screwed into tray back-latch body.	.....do	Securing latch handle.
Tray back-latch pin..	1	...do	In back-latch handle and body.	.....do	Securing latch-handle pin.
Tray back-latch pivot..	1	...do	Holds tray back latch to gun; also secures hinge pin.	.....do	
Breech plate	1	Bronze or steel.	Screwed to breech...	Removable only at factory.	Face plate.
Breech-plate screws....	13	Steel....	Screw breech plate to breech.	Interchangeable; the number varies in different guns.	Face-plate screws.
Breech-plate bushing..	1	Bronze	Screwed to front face of breech plate.	Interchangeable; used only on guns having steel breech plate.	
Breech-plate bushing screws.	4	Steel....	Hold breech-plate bushing to breech plate.	.....do	
Breechplate oil hole screw.	2	...do	Top of breech plate and gun.	Interchangeable	
Tray-latch catch.....	1	...do	Screwed to breech plate.	.....do	
Tray-latch catch screw.	1	...do ....	.....do	Used with guns having bronze breech plates; not interchangeable.	
Rotating ring	1	...do	Between breech plate and breech. Encloses breechblock.	Removable only at factory.	Gear ring.

Issued with gun as parts thereof.

Front axial sight	1	Steel....	Screwed into gun at trunnion hoop.	Interchangeable	
Rear axial sight	1	...do	Screwed to breech of gun.	.....do	
Rear axial sight screws.	2	...do	Hold rear axial sight to gun.	.....do	
Rear tangent-sight socket guard.	1	Brass...	On breech of gun....	Interchangeable; to protect socket during shipment.	
Rear tangent-sight socket-guard screws.	3	Steel....	Secure guard to breech.	Interchangeable	

8-INCH B. L. RIFLE, MODEL 1888.

Weight, 14½ gross tons (32,480 pounds).
Distance between rimbases, 32.5 inches.
Length of trunnions, 6 inches.
Distance of axis of trunnions from muzzle, 183 inches.
Total length, 278.5 inches.
Length of bore, 256.25 inches.^a
Maximum diameter of breech, 30 inches.
Diameter of muzzle, 14 inches.
Diameter of trunnions, 10 inches.
Powder chamber:
Diameter, 9.5 inches.
Length, 51 inches.^b
Capacity, 3,597 cubic inches.

^a Length of bore is distance from face of "mushroom head" to muzzle.^b Length of powder chamber is distance from face of "mushroom head" to base of projectile.

Travel of projectile in bore, 25.66 calibers, 205.25 inches.

Projectile:

Kind.	Armor-piercing shot.	Armor-piercing shell.	Cast-iron shot.
Weight (filled).....pounds..	800	800	800
Ratio of weight to weight of piece.....	1-107	1-107	1-107
Weight of bursting charge, gun cotton...pounds..	.....	.....	.....
Length.....calibers..	8.50	4.00	3.50
Sectional density $\frac{W}{r^2}$	5.97	5.97	5.97
Price each (without fuse or bursting charge)	\$65.00	\$38.00	\$14.10

Powder:

Kind, brown prismatic and smokeless, 8-inch breech-loading rifle.

Weight, 135 pounds brown; 70 pounds smokeless.

Density of loading, 1.0331 brown; 0.5354 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.

Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.

Smokeless, 37,000 pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 16.8 inches.

Smokeless, 19.6 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 15 inches.

Smokeless, 17.4 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 12.6 inches.

Smokeless, 14.6 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 11.4 inches.

Smokeless, 13 inches.

Muzzle energy:

Brown, 8,528 foot-tons.

Smokeless, 10,528 foot-tons.

Rifling:

Number of grooves, 48.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin; one turn in 25 calibers at 16 inches from muzzle, being uniform over the 16 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

8-INCH B. L. RIFLE, MODEL 1888 M¹.

(Price of rifle, \$12,827.)

INCLUDES GUN PROPER, BREECH MECHANISM, AND SIGHTS, AS PER LIST BELOW.

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock.....	1	Steel....	In breech.....	Interchangeable	Block.
Breechblock oil-hole screw.	1	...do....	Top of breechblock..	Not in all blocks; interchangeable.	
Translating stud.....	1	...do....	Fastened to breechblock.	Interchangeable; should not be removed.	
Translating-stud screw.	1	...do....	Fastens stud to breechblock.	Interchangeable	
Rotating-bar screws..	2	...do....	In rear part of breechblock.	To attach bar for rotating in case breechblock sticks.	
Obturator, complete:					
Obturator spindle, complete—					
Obturator spindle..	1	...do....	In breechblock.....	Interchangeable	Mushroom, spindle; also wrongly called obturator.
Obturator nut	1	...do....	On obturator spindle.	...do.....	Obturator spindle nut.
Obturator locking nut.	1	...do....	On obturator spindle, rear of obturator nut.	...do.....	Lock nut.
Vent bushing.....	1	Copper ..	In obturator-spindle head.	Interchangeable; can not be properly inserted at fort.	
Firing attachment, complete—					
Experimental attachments are under test; as soon as adopted list of parts will be furnished for insertion.					
Gas-check pad.....	1	Asbestos and tal-low in canvas.	On obturator spindle.	Interchangeable	Pad, gas-check.
Front split ring	1	Steel....	On obturator spindle, between head and pad.	...do.....	Front exterior split ring.
Rear split ring	1	...do....	On obturator spindle, between pad and filling-in disk.	...do.....	Rear exterior split ring.
Small split ring	1	...do....	...do.....	...do.....	Small interior split ring, spindle split ring.
Filling-in disk	1	...do....	On obturator spindle, between pad and breechblock.	...do.....	Disk.
Dust cover	1	...do....	Screwed to obturator-spindle nut.	...do.....	Dust guard.
Dust cover screws...	3	...do....	Screw dust cover to obturator-spindle nut.	Not interchangeable	Dust-guard screws.
Obturator-spindle washers.	2 2	Bronze . Steel ...	Between obturator nut and breechblock.	Interchangeable, except rear one, steel, which has rear face flat.	Antifriction washers.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray, complete:					
Tray.....	1	Bronse	Fastened to breech...	Interchangeable ...	Console.
Hinge-pin	1	Steel	Holds tray to gun...	Interchangeable; fastened in tray by tray back-latch pivot.	
Hinge-pin oil-hole screw.	1	...do	In hinge pin	Interchangeable; not in all guns.	
Translating roller...	1	...do	In tray	Interchangeable ...	
Translating crank ...	1	...do	On translating roller.	...do	
Translating-crank nut.	1	...do	Holds translating-crank to translating roller.	...do	
Translating-crank nut pin.	1	...do	Holds translating-crank nut on translating roller.	...do	
Tray latch, complete—					
Tray-latch body...	1	...do	Fastened to tray by tray-latch pivot.	Not interchangeable	
Tray-latch handle, male.	1	...do	In tray latch	Interchangeable; issued together.	
Tray-latch handle, female.	1	...do	...do		
Tray-latch handle pin.	1	...do	Holds 2 parts of handle together.	Interchangeable ...	
Tray-latch pivot....	1	...do	Holds tray latch to tray.	...do	
Tray-latch pivot washer.	1	...do	On tray-latch pivot...	...do	
Tray-latch pivot pin.	1	...do	In tray-latch pivot	...do	
Tray-spring bolt....	1	...do	In tray	Interchangeable; used in some guns of this model.	
Tray-spring bolt spring.	1	...do	On tray-spring bolt...	...do	
Tray-spring bolt....	1	...do	In tray	Interchangeable; used in all other guns of this model.	
Tray-spring bolt spring.	1	...do	On tray-spring bolt...	...do	
Tray-spring bolt shoe.	1	...do	...do .....	...do	
Tray-spring bolt-shoe screw.	1	...do	...do .....	...do	
Tray lock, complete—	1	...do	In tray in rear of tray-latch pivot.	Interchangeable; used in some guns of this model; is to be attached to all others.	
Tray-lock bolt....	1	...do	Fastened to tray by tray-lock lever pivot.	...do	Tray-lock cam.
Tray-lock lever....	1	...do	Connects lever with tray latch.	...do	
Tray-lock link....	1	...do	Connects lever and link.	...do	
Tray-lock link pin.	1	...do	Holds lever to tray ...	...do	
Tray-lock lever pivot.	1	...do	Connects tray latch to link.	...do	
Tray-lock pin.....	1	...do	Fastened to tray....	Interchangeable ...	Securing latch catch. Securing latch-catch screws.
Tray back-latch catch.	2	...do	Fasten tray back-latch catch to tray.	...do	
Tray back-latch catch screws.					
Rotating crank, complete:					
Rotating-crank body.	1	...do	Fastened to rotating pinion.	This old form of rotating crank used in some guns.	
Rotating-crank sleeve.	1	Wrought iron.	On spindle of rotating crank.	...do	
Rotating-crank sleeve screw.	1	Steel	Secures sleeve to spindle.	...do	
Rotating crank.....	1	...do	Fastened to rotating pinion.	Interchangeable; this one-piece crank is in a few guns only.	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Rotating crank, complete: Rotating-crank, body.	1	Steel....	Attached to rotating pinion.	This form of rotating crank is the latest and used on some guns of this model; is to be attached to others; interchangeable.	
Rotating-crank sleeve.	1	Bronze.	On crank spindle.....	do	
Rotating-crank sleeve washer.	1	Steel....	In end of crank sleeve.	do	
Rotating-crank sleeve-washer screw.	1	do	Holds sleeve and washer to crank handle.	do	
Rotating-crank sleeve screw.	1	do	Holds washer to sleeve.	do	
Rotating-crank nut.	1	do	Holds rotating crank to rotating pinion.	Interchangeable	
Rotating-crank nut pin.	1	do	Holds rotating-crank nut to rotating pinion.	do	
Rotating pinion.....	1	do	In breech plate	do	
Rotating-pinion washer.	1	do	On rotating pinion	do	
Rotating-pinion bushing.	1	Bronze.	In breech plate.....	do	
Rotating-pinion bushing screw.	1	Steel....	.....	do	
Rotating-crank lock bolt.	1	do	In rotating crank	Interchangeable; this old method of locking is used in only a few guns of this model; fits old crank.	Rotating-crank catch.
Rotating-crank lock spring.	1	do	do		
Rotating-crank lock housing.	1	Bronze.	Screwed into rotating crank.	This new method of locking is used in most guns of this model; fits latest style crank.	
Rotating-crank lock-housing screw.	1	Steel....	Screwed into rotating crank and crank-lock housing.		
Rotating-crank lock bolt.	1	do	In rotating crank	Some screwed in and held from turning by spline screw; some held in cylindrical seat by 3 screws.	
Rotating-crank lock housing.	1	Bronze.	.....	
Rotating-crank lock-housing screw.	1	Steel....	Screwed into rotating crank and crank-lock housing.		
Rotating-crank lock spring.	1	do	In rotating crank		
Rotating-crank lock washer.	1	do	do		
Rotating-crank lock handle.	1	Bronze.	do		
Rotating-crank lock-handle pin.	1	do	do		Wing nut.
Rotating-crank lock plate, upper.	1	Steel....	In breech plate.....		
Rotating-crank lock plate, lower.	1	do	do		
Rotating-crank lock plate spline screws.	Varies.	do .....	.....	
Rotating-crank lock plate screws.	Varies.	do .....	.....	
Vent cover	1	do	In breech block.....		
Vent-cover pivot	1	do	do	Interchangeable	
Tray back latch:					
Tray back-latch body	1	do	Fastened to breech	do	Securing latch body.
Tray back-latch handle.	1	do	Screwed into tray back-latch body.	do	Securing latch handle.
Tray back-latch pin.	1	do	In back-latch handle and body.	do	Securing latch-handle pin.
Tray back-latch pivot.	1	do	Holds tray back-latch to gun; also secures hinge pin.	do	
Breech plate	1	Bronze or steel.	Screwed to breech....	Removable only at factory.	Face plate.
Breech-plate screws.	13	Steel....	Screw breech plate to breech.	Interchangeable; the number varies in different guns.	Face-plate screws.
Breech-plate bushing.	1	Bronze.	Screwed to front face of breech plate.	Interchangeable; used only on guns having steel breech plates.	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breech-plate bushing screws.	4	Steel....	Holds breech-plate bushing to breech plate.	Interchangeable; used only on guns having steel breech plates.	
Breech-plate oil-hole screws.	2	...do....	Top of breech plate and gun.	Interchangeable....	
Tray-latch catch.....	1	...do....	Screwed to breech plate.	.....
Tray-latch catch screw	1	...do....	.....do.....	Used with guns having bronze breech plates; not interchangeable.	
Rotating ring.....	1	...do....	Between breech plate and breech. Encircles breechblock.	Removable only at factory.	Gear ring.

8-inch B. L. rifle, model 1888 M1—Issued with gun as parts thereof.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Front axial sight.....	1	Steel ...	Screwed into gun at trunnion hoop.	Interchangeable....	
Rear axial sight.....	1	...do....	Screwed to breech of gun.	....do.....
Rear axial-sight screws.	2	...do....	Holds rear axial sight to gun.	....do.....
Rear tangent-sight socket guard.	1	Brass...	On breech of gun....	Interchangeable. To protect socket during shipment.	
Rear tangent-sight socket-guard screws.	3	Steel ...	Secure guard to breech	Interchangeable....	

8-INCH B. L. RIFLE, MODEL 1888 M1.

Weight, 14.5 gross tons (32,480 pounds).

Distance between rimbases, 32.5 inches.

Length of trunnions, 6 inches.

Distance of axis of trunnions from muzzle, 183 inches.

Total length, 278.5 inches.

Length of bore, 256 inches.

Maximum diameter of breech, 30 inches.

Diameter of muzzle, 14 inches.

Diameter of trunnions, 10 inches.

Powder chamber:

Diameter, 9.5 inches.

Length, 50.75 inches.

Capacity, 3,597 cubic inches.

Travel of projectile in bore, 25.66 calibers, 205.25 inches.

Projectile:

Kind.	Armor-piercing shot.	Armor-piercing shell.	Cast-iron shot.
Weight (filled).....pounds..	300	300	300
Ratio of weight to weight of piece	1-107	1-107	1-107
Weight of bursting charge, gun cotton...pounds..	11.50	11.50	11.50
Length.....calibers..	3.50	4.00	3.50
Sectional density $\frac{W}{V}$	5.97	5.97	5.97
Price each.....	\$65.00	\$38.00	\$14.10

Powder:

Kind, brown prismatic and smokeless, 8-inch B. L. rifle.

Weight, 135 pounds brown; 70 pounds smokeless.

Density of loading, 1.0331 brown; 0.5354 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.

Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.

Smokeless, 37,000 pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 16.8 inches.

Smokeless, 19.6 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 15 inches.

Smokeless, 17.4 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 12.6 inches.

Smokeless, 14.6 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 11.4 inches.

Smokeless, 13 inches.

Muzzle energy:

Brown, 8,528 foot-tons.

Smokeless, 10,528 foot-tons.

Rifling:

Number of grooves, 48.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers 16 inches from muzzle, being uniform over the 16 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

8-INCH B. L. RIFLE, MODEL 1868 MIL

INCLUDES GUN PROPER, BREECH MECHANISM, AND SIGHTS, AS PER LIST BELOW.

(Price of rifle, \$12,327.)

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock	1	Steel.....	In breech.....	Interchangeable	Block.
Breechblock oil-hole screw.	1	...do.....	Top of breechblock...	Not in all blocks; interchangeable.	
Translating stud	1	...do.....	Fastened to breechblock.	Interchangeable; should not be removed.	
Translating-stud screw.	1	...do.....	Fastens stud to breechblock.	Interchangeable	
Rotating-bar screws.	2	...do.....	In rear part of breechblock.	To attach bar for rotation in case breechblock sticks.	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator, complete: Obturator spindle, complete— Obturator spindle.....	1	Steel....	In breechblock.....	Interchangeable....	Mushroom spindle; also wrongly called obturator.
Obturator nut.....	1	...do....	On obturator spindle.	.....do.....	Obturator-spindle nut.
Obturator locking nut.	1	...do....	On obturator spindle, rear of obturator nut.	.....do.....	Lock nut.
Vent bushing.....	1	Copper.	In obturator-spindle head.	Interchangeable; can not be properly inserted at fort.	
Firing attachment, complete—					
Experimental attachment— manus are under test; as soon as adopted list of parts will be furnished for insertion.					
Gas-check pad.....	1	Asbestos and tal- low in convex	On obturator spindle.	Interchangeable....	Pad, gas check.
Front split ring.....	1	Steel....	On obturator spindle between head and pad.	.....do.....	Front exterior split ring.
Rear split ring.....	1	...do....	On obturator spindle between pad and filling-in disk.	.....do.....	Rear exterior split ring.
Small split ring.....	1	...do....	.....do.....	.....do.....	Small exterior split ring, spindle split ring.
Filling-in disk.....	1	...do....	On obturator spindle between pad and breechblock.	.....do.....	Disk.
Dust cover.....	1	...do....	Screwed to obturator-spindle nut.	.....do.....	Dust guard.
Dust-cover screws...	3	...do....	Screw dust cover to obturator-spindle nut.	Not interchangeable.	Dust-guard screws.
Obturator-spindle washers.	2	Bronze.	{ Between obturator nut and breechblock.	Interchangeable, except rear one, steel, which has rear face flat.	Antifriction washers.
	2	Steel....			
Tray, complete:					
Tray.....	1	Bronze.	Fastened to breech...	Interchangeable....	Console.
Hinge pin.....	1	Steel....	Holds tray to gun....	Interchangeable; fastened in tray by tray back-latch pivot.	
Hinge-pin oil-hole screw.	1	...do....	In hinge pin.....	Interchangeable; not in all guns.	
Translating roller...	1	...do....	In tray.....	Interchangeable....	
Translating crank...	1	...do....	On translating roller.	.....do.....	
Translating-crank nut.	1	...do....	Holds translating crank to translating roller.	.....do.....	
Translating-crank nut pin.	1	...do....	Holds translating-crank nut on translating roller.	.....do.....	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray—Continued.					
Tray latch, complete—					
Tray-latch body...	1	Steel....	Fastened to tray by tray-latch pivot.	Not interchangeable.	
Tray-latch handle, male.	1	...do....	In tray latch	Interchangeable. Issued together.	
Tray-latch handle, female.	1	...do....	do		
Tray-latch handle pin.	1	...do....	Holds two parts of handle together.	Interchangeable....	
Tray-latch pivot....	1	...do....	Holds tray latch to tray.	...do	
Tray-latch pivot washer.	1	...do....	On tray-latch pivot....	...do	
Tray-latch pivot pin.	1	...do....	In tray-latch pivot....	...do	
Tray-spring bolt....	1	...do....	In tray	Interchangeable. Used in some guns of this model.	
Tray-spring bolt spring.	1	...do....	On tray-spring bolt....	...do	
Tray-spring bolt....	1	...do....	In tray	Interchangeable. Used in all other guns of this model.	
Tray-spring bolt spring.	1	...do....	On tray-spring bolt....	...do	
Tray-spring bolt shoe.	1	...do....	do .....	...do	
Tray-spring bolt-shoe screw.	1	...do....	do .....	...do	
Tray lock, complete—					
Tray-lock bolt....	1	...do....	In tray in rear of tray-latch pivot.	Interchangeable. Used in some guns of this model. Is to be attached to all others.	
Tray-lock lever....	1	...do....	Fastened to tray by tray-lock lever pivot.	...do	Tray-lock cam.
Tray-lock link....	1	...do....	Connects lever with tray latch.	...do	
Tray-lock link pin.	1	...do....	Connects lever and link.	...do	
Tray-lock lever pivot.	1	...do....	Holds lever to tray....	...do	
Tray-lock pin....	1	...do....	Connects tray latch to link.	...do	
Tray back-latch catch.	1	...do....	Fastened to tray....	Interchangeable....	Securing latch catch.
Tray back-latch catch screws.	2	...do....	Fasten tray back-latch catch to tray.	...do	Securing latch-catch screws.
Rotating crank, complete:					
Rotating-crank body.	1	...do....	Fastened to rotating pinion.	This old form of rotating crank used in some guns.	
Rotating-crank sleeve.	1	Wrought iron.	On spindle of rotating crank.	...do	
Rotating-crank sleeve screw.	1	Steel....	Secures sleeve to spindle.	...do	
Rotating crank.....	1	...do....	Fastened to rotating pinion.	Interchangeable. This one-piece crank is in a few guns only.	
Rotating crank, complete:					
Rotating-crank body.	1	...do....	Attached to rotating pinion.	This form of rotating crank is the latest and used on some guns of this model; is to be attached to others; interchangeable.	
Rotating-crank sleeve.	1	Brass....	On crank spindle....	...do	
Rotating-crank sleeve washer.	1	Steel....	In end of crank sleeve.	...do	
Rotating-crank sleeve washer screw.	1	...do....	Holds sleeve and washer on crank.	...do	
Rotating-crank sleeve screw.	1	...do....	Holds washer to sleeve.	...do	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Rotating-crank nut....	1	Steel....	Holds rotating crank to rotating pinion.	Interchangeable....	Rotating-crank catch.
Rotating-crank nut pin.	1	...do....	Holds rotating-crank nut to rotating pinion.	...do....	
Rotating pinion.....	1	...do....	In breech plate.....	...do....	
Rotating-pinion washer.	1	...do....	On rotating pinion....	...do....	
Rotating-pinion bushing.	1	Bronze..	In breech plate.....	...do....	
Rotating-pinion bushing screw.	1	Steel....	.....	...do....	
Rotating-crank lock bolt.	1	...do....	In rotating crank....	Interchangeable; this old method of locking is used in only a few guns of this model; fits old crank.	
Rotating-crank lock spring.	1	...do....	...do....		
Rotating-crank lock housing.	1	Bronze..	Screwed into rotating crank.		
Rotating-crank lock-housing screw.	1	Steel....	Screwed into rotating crank and crank-lock housing.		
Rotating-crank lock bolt.	1	...do....	In rotating crank....	This new method of locking is used in most guns of this model; fits latest style crank.	
Rotating-crank lock housing.	1	Bronze..	.....	
Rotating-crank lock-housing screw.	1	Steel....	Screwed into rotating crank and crank-lock housing.		
Rotating-crank lock spring.	1	...do....	In rotating crank....		
Rotating-crank lock washer.	1	...do....	...do....	Some screwed in and held from turning by 1 spline screw, some held in cylindrical seat by 3 screws.	
Rotating-crank lock handle.	1	Bronze..	...do....		
Rotating-crank lock-handle pin.	1	...do....	...do....		
Rotating-crank lock plate, upper.	1	Steel....	In breech plate.....		
Rotating-crank lock plate, lower.	1	...do....	...do....		
Rotating-crank lock-plate spline screws.	varies	...do....	Fasten plate to breech plate.		
Rotating-crank lock-plate screws.	varies	...do....	...do....		
Vent cover.....	1	...do....	In breechblock.....	Interchangeable....	
Vent-cover pivot.....	1	...do....	...do....	...do....	
Tray back latch:					
Tray back-latch body.	1	...do....	Fastened to breech....	...do....	Securing latch body.
Tray back-latch handle.	1	...do....	Screwed into tray back-latch body.	...do....	Securing latch handle.
Tray back-latch pin.	1	...do....	In back-latch handle and body.	...do....	Securing latch-handle pin.
Tray back-latch pivot.	1	...do....	Holds tray back-latch to gun; also secures hinge pin.	...do....	.
Breech plate.....	1	Bronze or steel.	Screwed to breech....	Removable only at factory.	Face plate.
Breech-plate screws...	13	Steel....	Screw breech plate to breech.	Interchangeable; the number varies in different guns.	Face-plate screws.
Breech-plate bushing..	1	Bronze..	Screwed to front face of breech plate.	Interchangeable; used only on guns having steel breech plate.	
Breech-plate bushing screws.	....	Steel....	Holds breech-plate bushing to breech plate.	...do....	
Breech-plate oil-hole screws.	2	...do....	Top of breech plate and gun.	Interchangeable....	
Tray-latch catch.....	1	...do....	Screwed to breech plate.	.....
Tray-latch catch screw	1	...do....	...do....	Used with guns having bronze breech plate; not interchangeable.	
Rotating ring.....	1	...do....	Between breech plate and breech; encloses breechblock.	Removable only at factory.	Gear ring.

8-inch B. L. rifle, model 1888 M11—Issued with gun as parts thereof.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Front axial sight.....	1	Steel....	Screwed into gun at trunnion hoop.	Interchangeable	
Rear axial sight.....	1	...do....	Screwed to breech of gun.	.....do	
Rear axial-sight screws	2	...do....	Hold rear axial sight to gun.	.....do	
Rear tangent-sight socket guard.	1	Brass ...	On breech of gun.....	Interchangeable; to protect socket during shipment.	
Rear tangent-sight socket-guard screws.	3	Steel....	Secure guard to breech	Interchangeable	

8-INCH B. L. RIFLE, MODEL 1888 M11.

Weight, 14.5 gross tons (32,480 pounds).

Distances between rimbases, 32.5 inches.

Length of trunnions, 6 inches.

Distance of axis of trunnions from muzzle, 183 inches.

Total length, 278.5 inches.

Length of bore, 256.25 inches.

Maximum diameter of breech, 30 inches.

Diameter of muzzle, 14 inches.

Diameter of trunnions, 10 inches.

Powder chamber:

Diameter, 9.5 inches.

Length, 51 inches.

Capacity, 3,596.6 cubic inches.

Travel of projectile in bore, 25.66 calibers, 206.25 inches.

Projectile:

Kind.	Armor-piercing shot.	Armor-piercing shell.	Cast-iron shot.
Weight (filled) .....pounds..	300	300	300
Ratio of weight to weight of piece	1-107	1-107	1-107
Weight of bursting charge, gun cotton .....pounds..		11.50	
Length.....calibers..	3.50	4.00	3.50
Sectional density $\frac{W}{V \times 1}$	5.97	5.97	5.97
Price each.....	\$95.00	\$98.00	\$14.00

Powder:

Kind, brown prismatic and smokeless, 8-inch breech-loading rifle.

Weight, 135 pounds brown; 70 pounds smokeless.

Density of loading, 1.0331 brown; 0.5354 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.

Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.

Smokeless, 37,000 pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 16.8 inches.

Smokeless, 19.6 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 15.0 inches.

Smokeless, 17.4 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 12.6 inches.

Smokeless, 14.6 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 11.4 inches.

Smokeless, 13.0 inches.

Muzzle energy:

Brown, 8,528 foot-tons.

Smokeless, 10,528 foot-tons.

Rifling:

Number of grooves, 48.

Width of grooves, 0.3736 inches.

Depth of grooves, 0.06 inches.

Width of lands, 0.15 inches.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 16 inches from muzzle, being uniform over the 16 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

TELESCOPIC SIGHTS.

One telescopic sight is furnished with each gun for use either on sight standard attached to carriage or on trunnions. (For description of telescopic sight, brackets for holding same, etc., see Handbook of Sights for Cannon, 1899.)

FUZES.

Fuzes used with projectiles for 8-inch breech-loading rifles are:

For shell detonating—"High resistance base fuze, 'A,' model 1900, F. A."

PRIMERS.

Obturator, electric (screwed), double wire, model 1899, F. A.

Obturator, electric (screwed), single wire, model 1900, F. A.

Obturator, electric (new model), F. A.

Combination electric and friction, model 1900, F. A.

CLEANING MATERIAL.

For allowance of cleaning material, etc., per annum, see Supply Table, page 359-360.

SPARE PARTS FOR GUN.

The following spare parts are issued for 8-inch breech-loading rifle, model 1898 and modifications, to wit:

		Price each.
Firing attachment, complete.....	1 per post	\$112.00
Gas-check pad	1 for each 2 guns...	7.00
Front split ring	1 per post	13.00
Rear split ring	1 per post	13.00
Small split ring	1 per post	6.50
Translating roller.....	1 per post	17.50
Tray latch, complete.....	1 for every 3 guns..	30.00
Tray-spring bolt.....	1 for every 3 guns..	5.25
Tray-spring-bolt spring	1 per gun.....	1.30

		Price each.
Tray-spring-bolt shoe.....	1 for every 3 guns..	\$2. 25
Tray-spring-bolt shoe screw.....	1 for every 3 guns..	. 65
Tray-lock bolt.....	1 per post.....	6. 75
Tray-lock lever.....	1 per post.....	5. 25
Tray-lock link.....	1 per post.....	4. 50
Tray-lock link pin.....	1 per post.....	. 65
Tray-lock lever pivot.....	1 per post.....	1. 30
Tray-lock pin.....	1 per post.....	. 65
Tray-back latch catch.....	1 per post.....	4. 50
Rotating-crank lock bolt.....	1 per post.....	3. 25
Rotating-crank lock spring.....	1 per post.....	. 32
Rotating-crank lock washer.....	1 per post.....	. 65
Rotating-crank lock handle.....	1 per post.....	3. 25
Rotating-crank lock-handle pin.....	1 per post.....	. 32
Vent cover.....	1 per post.....	6. 00
Tray back latch.....	1 per post.....	21. 50
Translating stud.....	1 per battery.....	25. 00
Translating crank.....	1 per battery.....	35. 28
Rotating-crank lock plate, upper.....	1 per battery.....	1. 75
Rotating-crank lock plate, lower.....	1 per battery.....	1. 75
Rotating-crank lock-plate screws.....	1 set per battery...	. 32
Hinge-pin oil hole screws.....	2 per gun.....	. 32
Breechblock oil hole screws.....	2 per gun.....	. 32

NOTE.—A set of spare parts, as enumerated above, should always be kept on hand at post.

In ordering spare parts always give the name of maker, model, and number of gun for which parts are required.

See note on page 43 as to spare parts.

SUBCALIBER TUBES.

One-pounder subcaliber tubes are issued for use with 8-inch breech-loading rifles, one to each post having guns of this caliber mounted. The list of parts of tube and fixtures are as follows:

List of parts of subcaliber tube and fixtures.

1 gun.	1 rear adapter.
1 adapter clamp wedge.	1 front adapter.
1 clamp wedge screw.	1 muzzle support.
1 thread clamp screw.	

ACCESSORIES AND SPARE PARTS FOR SUBCALIBER TUBE.

The following accessories and spare parts are furnished with each subcaliber tube for 8-inch breech-loading rifle, to wit:

1 hand extractor.	2 securing screws.
1 handspike.	1 adjusting wrench.
1 bristle sponge.	1 oil can.
1 sponge rod.	1 breech cover } or cover for entire
1 locating gauge.	1 muzzle cover } tube.
1 clamping wrench (for both clamp	1 vent cleaner.
screws).	1 thread clamp screw.
1 clip extractor.	1 securing screw wrench.
1 obturator spindle plate.	1 storage chest.

Subcaliber tubes and fixtures, when not in use, should always be kept in the special storage chest issued for that purpose.

For more complete description of subcaliber tubes see pamphlet "Directions for using, mounting, etc., of 1-pounder subcaliber tubes" issued by Ordnance Department, U. S. Army. (Price of tube complete, with accessories and spare parts, \$394.)

DECAPPING TOOLS.

There are issued to each post, equipped with 8-inch breech-loading rifle, one set of tools for decapping and cleaning 1-pounder subcaliber ammunition. These sets are termed "Decapping and cleaning sets for 1-pounder subcaliber ammunition," and are composed of the following:

	Price each.
1 decapping spindle	
1 decapping anvil	
1 cleaning brush	
Total.....	per set.. \$2.50

8-INCH BARRETTE CARRIAGE, MODEL 1892.

(Price of carriage, \$12,862.48; price of separate ammunition truck, \$65.)

(Price of shot tonga, \$7.92 each.)

(Shot tonga, 7 per carriage.)

Weights of parts of carriage.

No.	Name of part.	Material.	Weight.
			<i>Pounds.</i>
1	Top carriage.....	Cast steel.....	6,620
1	Chassis.....	Cast iron.....	19,000
1	Base plate.....	do.....	19,860
1	Worm..... Elevating apparatus..	Forged steel.....	36
1	Worm wheel.....	Bronze.....	49
1	Pinion.....	Forged steel.....	13
1	Rack.....	do.....	60
1	Shaft for worm.....	do.....	22
1	Shaft for worm wheel.....	do.....	20
1	Shaft for miters.....	do.....	75
1	Shaft for handwheel.....	do.....	73
2	Collars.....	do.....	7
4	Miters.....	Bronze.....	32
2	Handwheels.....	do.....	140
1	Friction clamp.....	do.....	23
6	Bushings.....	do.....	56
1	Front bearing.....	Wrought iron.....	30
1	Rear bearing.....	do.....	40
2	Piston rods.....	Forged steel.....	340
2	Piston heads.....	do.....	90
16	Recoil rollers.....	do.....	864
16	Journals for recoil rollers.....	do.....	112
2	Nuts for piston rods.....	do.....	84
2	do.....	do.....	28
2	Stuffing boxes.....	Bronze.....	280
2	Rear cylinder heads.....	Cast steel.....	252
4	Throttling bars.....	Forged steel.....	120
1	Journal for worm wheel..... Traversing apparatus..	do.....	84
1	Crank shaft.....	do.....	85
2	Cranks, with handles.....	Wrought iron.....	40
2	Guide wheels.....	do.....	28
2	Bolts, chain connection.....	Forged steel.....	16
1	Worm.....	do.....	72
1	Worm wheel.....	Bronze.....	122
1	Sprocket wheel.....	Cast iron.....	61
2	Supports for guide wheel.....	Wrought iron.....	88
2	Distance rings.....	do.....	680
10	Braces.....	Cast iron.....	130
2	Brackets.....	do.....	162
20	Conical rollers.....	Forged steel.....	2,800
4	Guide hooks.....	do.....	562
1	Crank shaft..... Elevating apparatus for projectile	do.....	90
2	Cranks, with handles.....	Wrought iron.....	40
1	Loading tray.....	Forged steel.....	66
1	Platform.....	Iron and steel.....	1,014
	Bolts, nuts, etc.....	do.....	1,084
	Total weight.....		54,866

List of the parts of carriage, location, material, correct nomenclature, etc.

Name of part.	Location.	Material.	Number.	Dimensions of bolts.		
				Length.	Diameter.	Kind.
				Inches.	Inches.	
Azimuth-circle (sections)	On base ring	Brass	6			
Azimuth-circle screws	Through azimuth circle.	do	6			
Azimuth pointer	On right rear clip ..	Bronze	1			
Azimuth-pointer screws	Through azimuth pointer.	do	2			
Azimuth-pointer dowel pins.	do	Steel	2			
Base ring	On platform	Cast iron	1			
Bar wrench for cylinder head.	Implement chest ..	Steel	1			
Box wrench for friction clamp.	do	do	1			
Clips	Holding racer to base ring.	Forged steel ..	4			
Clip bolts	Attaching clips to racer.	Wrought iron ..	20	5.6	1.875	Tap.
Cap-squares	Over trunnions ..	Steel	2			
Cap-square bolts	do	do	4		1	Tap.
Chassis sight standard ..	Rear of right chassis cheek.	Bronze	1			
Chassis sight-standard bolts.	Through sight standard.	Wrought iron ..	4			
Counter-recoil buffer bushing.	In rear cylinder head.	Bronze	1			
Crane mast	In crane brackets ..	Wrought iron ..	1			
Crane sheaves	In crane mast	Bronze	2			
Crane-sheave journal ..	do	Steel	1			
Crane-sheave journal nut.	On journal	do	1			
Crane-sheave hood	On crane mast	Wrought iron ..	1			
Crane-sheave hood screws.	In crane mast	Steel	2			
Crane-block frame	In hoisting tackle ..	Wrought iron ..	1			
Crane-block hook	Crane block	do	1			
Crane-block hook nut ..	do	do	1			
Crane-block hook-nut pin.	do	Steel	1			
Crane-block sheave	do	Bronze	1			
Crane-block journal	do	Steel	1			
Crane-block journal nut ..	do	do	1			
Crane-block guard	do	Wrought iron ..	1			
Chassis sight platform ..	Right loading-platform bracket.	Steel	1			
Chassis sight-platform braces.	do	Wrought iron ..	2			
Chassis sight-platform bolts.	Through braces	do	4			
Dust guard (sections) ..	Covering roller ring.	Wrought iron ..	4			
Dust-guard screws	Dust guard	do	36	1.81	.375	Screw.
Double wrenches	Implement chest ..	Steel	3			
Equalizing-pipe unions.	Equalizing pipe	Bronze	2			
Equalizing pipe	Joining recoil cylinders.	Copper	1			
Equalizing-pipe packing ring.	Equalizing pipe	Wrought iron ..	1			
Equalizing-pipe reducing plugs.	do	Steel	2			
Elevating side shaft	On right chassis rail.	do	1			
Elevating side-shaft collars.	On elevating side shaft.	do	2			
Elevating side-shaft collar set screws.	do	do	2		.625	
Elevating side-shaft rear bevel gear.	do	Bronze	1			
Elevating side-shaft rear bevel-gear nut.	do	Steel	1			
Elevating side-shaft front bevel gear.	do	Bronze	1			
Elevating through shaft.	Through chassis rails	Steel	1			
Elevating through-shaft bushings.	Chassis rails	Bronze	2			
Elevating through-shaft bushing screws.	do	Wrought iron ..	4	2.25	.625	Screw.
Elevating through-shaft bevel gear.	Elevating through shaft.	Bronze	1			
Elevating through-shaft bevel-gear spline.	do	Steel	1			
Elevating through-shaft handwheels.	do	Bronze	2			

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Dimensions of bolts.		
				Length.	Diameter.	Kind.
Elevating through-shaft handwheel nuts.	Elevating through-shaft.	Wrought iron.	2	Inches.	Inches.	
Elevating worm shaft.	On top carriage.	Steel.	1			
Elevating worm-shaft bevel gear.	Elevating wormshaft.	Bronze.	1			
Elevating worm-shaft bevel-gear spline.	do.	Steel.	1			
Elevating worm.	do.	do.	1			
Elevating rack.	On gun.	do.	1			
Elevating-rack bolts.	In elevating rack.	do.	2	3.625	1.25	Screw.
Elevating pinion.	Engaging in elevating rack.	do.	1			
Elevating-pinion spline.	Elevating-pinion shaft.	do.	1			
Elevating-pinion shaft.	On top carriage.	do.	1			
Elevating worm wheel.	Elevating-pinion shaft.	do.	1			
Elevating friction clutch.	do.	Bronze.	1			
Elevating friction-clutch spline.	do.	Steel.	1			
Elevating friction-clutch nut.	do.	Wrought iron.	1			
Elevating side-shaft front bracket.	On right chassis rail.	do.	1			
Elevating side-shaft front bracket bolts.	do.	do.	2	3.25	1	Tap.
Elevating side-shaft rear bracket.	do.	do.	1			
Elevating side-shaft rear bracket bolts.	do.	do.	2	3.25	1	Tap.
Elevating side-shaft rear bevel-gear pin.	Through bevel-gear nut.	Steel.	1			
Elevating side-shaft bushing.	In front bracket.	Bronze.	1			
Elevating worm-shaft collar.	Elevating worm shaft.	Steel.	1			
Elevating worm-shaft collar pin.	do.	do.	1			
Elevating worm-shaft washer.	do.	Wrought iron.	1			
Elevating worm-shaft bolt.	do.	do.	1			
Elevating worm-shaft journal bushings.	In bearings.	Bronze.	2			
Elevating worm spline.	Elevating worm shaft.	Steel.	1			
Elevating pinion-shaft journal bushings.	In bearings.	Bronze.	2			
Elevating side-shaft front bracket stud.	In chassis side.	Steel.	1			
Elevating side-shaft front bracket-stud nut.	Front bracket stud.	Wrought iron.	1			
Elevation direction plate.	Chassis sides.	Bronze.	2			
Elevation direction-plate screws.	Through direction plate.	do.	8			
Elevation-indicator pointer.	Right cap-square.	do.	1			
Elevation-indicator counterpoise.	On pointer.	do.	1			
Elevation-indicator counterpoise-set-screw.	In counterpoise.	Wrought iron.	1			
Elevation-indicator pinion.	Right cap-square.	Bronze.	1			
Elevation-indicator pinion stud.	do.	Steel.	1			
Elevation-indicator pinion-stud lock pin.	do.	do.	1			
Elevation-indicator pinion-stud washer.	On pinion stud.	do.	1			
Elevation-indicator pinion-stud nut.	do.	Wrought iron.	1			
Elevation-indicator rack.	On right trunion.	Bronze.	1			
Elevation-indicator rack screws.	In right trunion.	do.	2			
Elevation-indicator arc.	Right side top carriage.	do.	1			
Elevation-indicator arc screws.	do.	Wrought iron.	3			
Filling-hole plugs.	In recoil cylinders.	do.	2	3.25	1	Tap.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material	Number.	Dimensions of bolts.		
				Length.	Diameter.	Kind.
				<i>Inches.</i>	<i>Inches.</i>	
Guide-sheave bracket...	On crane mast.....	Wrought iron	1			
Guide-sheave bracket bolt.	In bracket.....	do	1			
Guide-sheave bracket-bolt nut.	On bracket bolt.....	do	1			
Guide-sheave journal.	In bracket.....	Steel	1			
Guide-sheave journal nut.	On journal.....	do	1			
Guide sheave.....	In bracket.....	Bronze	1			
Hand-rail brackets.....	Loading platform	Wrought iron	8			
Hand-rail elbows.....	do	do	4			
Hand-rail bracket bolts.	do	do	16			
Inner distance ring.....	Live roller ring	do	1			
Implement chest.....	do	Wood	1			
Loading-platform floor (section).	On floor brackets.....	Cast iron	2			
Loading-platform brackets.	On racer.....	Wrought iron	4			
Loading-platform bracket T-irons.	On brackets.....	do	4			
Loading-platform bracket T-iron rivets.	In angle irons.....	do				
Lower crane bracket.....	Left chassis side.....	Gun iron	1			
Lower crane-bracket key.	In lower crane bracket.	Steel	1			
Lower crane-bracket washer.	do	Wrought iron	1			
Lower crane-bracket bolt.	do	do	1			
Leveling screws.....	In base ring.....	Bronze	8			
Outer distance ring.....	Live roller ring	Wrought iron	1			
Oil plugs.....	In oil holes.....	Bronze	28			
Oil can.....	Implement chest	Brass	1			
Oil can with valve.....	do	do	1			
Piston rods.....	In recoil cylinders.....	Steel	2			
Piston-rod nuts.....	On piston rods.....	do	2			
Piston-rod check nuts.....	do	do	2			
Platform steps.....	Loading platform	Wrought iron	8			
Platform-step supports.....	do	do	4			
Platform-step struts.....	do	do	4			
Platform-step strut bolts.....	do	do	12			
Platform-step hand rails.....	do	do	4			
Platform stanchions.....	do	do	2			
Piston cover (sections).....	On pistons.....	Bronze	4			
Piston-cover screws.....	Through piston covers.	do	48			
Piston-rod wrenches.....	Implement chest.....	Steel	2			
Platform bolts.....	Securing base ring to platform.	Aluminum bronze.	16	56.5	2	Through.
Platform-bolt washers.....	On platform.....	Bronze	16			
Racer and chassis.....	On top of live roller ring.	Cast iron	1			
Recoil rollers.....	In chassis-rail recess.	Steel	16			
Recoil-roller bushings.....	In recoil rollers.....	Bronze	16			
Recoil-roller axles.....	Bearings for recoil rollers.	Steel	16	8	2	Screw bolts.
Recoil-cylinder rear head.	In recoil cylinder.....	Bronze	2			
Recoil-cylinder follower.....	do	do	2			
Recoil-cylinder bushing.....	do	do	2			
Recoil-cylinder gland.....	do	do	2			
Separator bolts.....	Live roller ring	Wrought iron	10	14.64	1	Through.
Separator-bolt nuts.....	do	do	10			
Separators.....	do	Cast iron	10			
Sprocket wheel.....	In front of racer.....	Cast steel	1			
Sprocket-wheel washer.....	do	Wrought iron	1			
Shot-hoist crank shaft.....	Connecting chassis rails.	Steel	1			
Shot-hoist crank-shaft collars.	On crank shaft.....	Wrought iron	2			
Shot-hoist crank-shaft collar set screws.	Shot-hoist shaft.....	do	4			
Shot-hoist crank.....	On crank shaft.....	do	2			
Shot-hoist crank handles.....	do	do	2			
Shot-hoist crank-handle sleeves.	On crank handles.....	Wood	2			
Shot-hoist crank-handle sleeve ferrules.	Crank-handle sleeve.	Brass	4			
Shot-hoist crank-handle nuts.	On crank handles.....	Wrought iron	2			

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Dimensions of bolts.		
				Length.	Diameter.	Kind.
Shot-hoist crank-shaft spline.	On shaft.....	Wrought iron.....	1	Inches.	Inches.	
Shot-hoist shaft bushings.	In chassis rails.....	Bronze.....	2			
Shot-hoist drum.....	Shot-hoist crank shaft.....	Cast iron.....	1			
Shot-hoist drum set screw.	In drum.....	Steel.....	1			
Shot-hoist pawl.....	In bracket.....	Wrought iron.....	1			
Shot-hoist pawl journal.	.....do.....	.....do.....	1			
Shot-hoist pawl journal nut.	On journal.....	.....do.....	1			
Shot-hoist pawl bracket.	On racer.....	.....do.....	1			
Shot-hoist pawl bracket bolts.	In racer.....	.....do.....	2			
Shot-hoist pawl stop....	In bracket.....	.....do.....	1			
Shot-hoist pawl-stop bracket.	On racer.....	.....do.....	1			
Shot-hoist pawl-stop bracket bolts.	In racer.....	.....do.....	2			
Shot-hoist pawl-stop chain.	On pawl stop.....	.....do.....	1			
Shot-hoist pawl-stop eyebolt.	In racer.....	.....do.....	1			
Shot-hoist rope.....	On crane.....	Manila.....	1			
Shot-hoist rope hook....	Shot-hoist rope.....	Wrought iron.....	1			
Shot-hoist rope thimble.	.....do.....	.....do.....	1			
Screw-eye extractor....	Implement chest.....	.....do.....	2			
Screw-driver for dust guard.	.....do.....	.....do.....	1			
Screw-driver for recoil-roller journal.	.....do.....	.....do.....	1			
Screw-driver, wooden handle.	.....do.....	Steel.....	1			
Spanner wrench for stuffing box.	.....do.....	.....do.....	1			
Single wrenches.....	.....do.....	.....do.....	4			
Traversing chain.....	On base ring.....	Wrought iron.....	1	Link 3.5	.625	
Traversing-chain ear bolts.	Attaching chain to base ring.	Forged steel.....	2			
Traversing-chain ear-bolt nuts.	On ear bolts.....	Wrought iron.....	2			
Traversing-chain coupling pins.	Attaching chain to base ring.	Forged steel.....	2	3.05	.75	Bolt pins.
Traversing-chain coupling-pin washers.	.....do.....	.....do.....	2			
Traversing-chain coupling-pin cotter pins.	.....do.....	Wrought iron.....	2			
Traversing rollers.....	Live roller ring.....	Forged steel.....	20			
Traversing shaft.....	In front of racer.....	Steel.....	1			
Traversing worm.....	On traversing shaft.....	.....do.....	1			
Traversing-worm spline.....	.....do.....	.....do.....	1			
Traversing cranks.....	.....do.....	Wrought iron.....	2			
Traversing-crank handles.	.....do.....	.....do.....	2	11.25	1	
Traversing-crank handle nuts.	.....do.....	.....do.....	2			
Traversing-crank handle sleeves.	.....do.....	Wood.....	2			
Traversing-chain-pulley brackets.	In front of racer.....	Cast steel.....	2			
Traversing-chain-pulley bracket bolts.	.....do.....	Steel.....	6			
Traversing-chain pulleys.	.....do.....	Wrought iron.....	2			
Traversing-chain-pulley mortise bolts.	.....do.....	Steel.....	2			
Traversing-chain-pulley mortise-bolt nuts.	.....do.....	.....do.....	2			
Traversing-chain-pulley axle bolts.	.....do.....	Wrought iron.....	2	6.125	1.5	Tap.
Traversing-shaft bushings.	Chassis-rail front brackets.	Bronze.....	2			
Traversing-worm gear....	In front of racer.....	Cast steel.....	1			
Traversing-worm-wheel axle.	.....do.....	Steel.....	1			
Traversing-worm-wheel axle nut.	.....do.....	Wrought iron.....	1			
Top carriage.....	On chassis rails.....	Cast steel.....	1			
Throttling bars.....	In recoil cylinders.....	Steel.....	4			
Throttling-bar bolts....	.....do.....	.....do.....	14			Tap.
Traversing-worm collars.	On traversing shaft.....	.....do.....	2			
Traversing-worm-collar set screws.	.....do.....	.....do.....	4			

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Dimensions of bolts		
				Length.	Diameter.	Kind.
Traversing direction plate.	On chassis side	Bronze	2	<i>Inches.</i>	<i>Inches.</i>	
Traversing direction-plate screws.	Through direction plates.	.....do	8			
Traversing-worm-wheel axle-nut split pin.	Through axle nut...	Steel	1			
Thrust plates	On platform .....	.....do	8			
Upper crane bracket.	Left chassis side.	Gun iron	1			
Upper crane-bracket bolts.	.....do	Wrought iron	6			

8-INCH DISAPPEARING CARRIAGE, L. F., MODEL 1894.

(Price of carriage, \$15,736.17.)

Weights of the principal parts of carriage.

Name.	Weight.
	<i>Pounds.</i>
Chassis, racer, top carriage, traversing-wheel transom, etc	31,685
Base ring, with traversing rollers and distance rings	7,515
Traversing circle (4 segments)	6,075
Traversing chain, with pulley brackets, pulleys, bolts, and washers	318
Gun-lever arms, with axle, crosshead, and suspension rods	7,500
Elevating arms, with truss, boxes, and caps	888
Crane frame	370
Bottom plate for counterweight	875
Lead counterweight	34,000
Joint plates for traversing circle	422
Other small parts, with bolts, implements, etc	1,352
Total	94,000

List of the parts of carriage, location, material, correct nomenclature, etc.

Name of part.	Location.	Material.	Number.	Diameter or width.	Length.	Nuts.	Remarks.
				<i>In.</i>	<i>In.</i>		
Azimuth circle	On traversing circle	Brass	1				
Axle keys	Traversing-wheel axles	Forged steel	4	2½	6		
Base ring	On platform	Gun iron	1	105			
Ball washers	On traversing-worm shaft.	Steel	2				Each with 2 washers and 2½-inch hardened steel balls.
Bearing, lower	Vertical shaft of traversing clamp.	Cast iron	1	2½	7		
Bolts	Equalizing pipe straps	Wrought iron	2	½	½		
Do	Emptying coupling straps.	.....do	4	½	½		
Do	Top carriage caps .....	.....do	4	1½	6½		
Do	Chassis to racer .....	.....do	80	1½	3½		
Do	Chassis to traversing-wheel transom.	.....do	22	1½	2½		
Do .....	.....do .....	.....do	4	1½	3		
Do	Vertical liners on chassis .....	.....do	10	½	2		
Do	Chassis to transoms .....	.....do	46	1½	2½		
Do	Elevating rack guides to chassis.	.....do	32	1	3		
Do	Roller dust guard to racer.	.....do	23	½	1		

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter or width.	Length.	Nuts.	Remarks.
Bolts	Joint plates to roller dust guard.	Wrought iron.	24	In.	In.	...	
Do.	Traverse-wheel axle keys	do	8	1	1 1/2	...	
Do.	Traverse-gear bracket.	do	6	1	2 1/2	...	
Do.	Traverse-clamp hinge bracket.	do	4	1	4 1/2	...	
Do.	Traverse-clamp vertical shaft bearing.	do	2	1	1 1/2	...	
Do.	Handle to gun lever	do	2	1	1 1/2	...	
Do.	Elevating arms to trunk	do	2	1 1/2	3 1/2	...	
Do.	do	do	4	1 1/2	4	...	
Do.	Stop plate to elevating rack guides.	do	6	1 1/2	2 1/2	...	
Do.	Elevating-rack trunnion	do	2	1 1/2	2	...	
Do.	Elevating clamp	do	1	1	16	2	
Do.	Chain-pulley brackets.	do	2	1	1 1/2	...	
Do.	Crosshead liners.	do	4	1	1 1/2	...	
Do.	Elevating band	do	1	2	6	1	
Do.	Piston-rod brackets.	do	4	1	8	...	
Do.	Piston-rod bracket and sight platform.	do	2	1	3 1/2	...	
Do.	Sighting platform and ladder braces.	do	2	1	2 1/2	2	Countersunk head.
Do.	Trunnion-sight platform	do	2	1	1 1/2	2	Do.
Do.	Chassis-platform braces	do	2	1	1 1/2	...	
Do.	Ladder brace	do	2	1	1 1/2	...	
Do.	Sight standard caps	do	4	1	2 1/2	4	
Do.	Trunnion sight platform	do	2	1	3	2	
Do.	do	do	2	1	1 1/2	...	
Do.	Joint plates, trav. circle	do	24	1	2 1/2	...	
Do.	Throttling bars	Forged steel	32	1	2 1/2	...	
Do.	do	do	4	1	2 1/2	...	
Do.	Elevation pointer	Wrought iron.	2	1	1 1/2	...	
Do.	Hand rail on cylinder	do	4	1	1 1/2	...	
Do.	Racer clip	do	4	1 1/2	8	...	
Do.	Handle on gun lever	do	2	1	1 1/2	...	
Brackets, piston rod.	On rear of right chassis	Cast steel	1	8 1/2	19 1/2	...	
Do.	On rear of left chassis	Cast iron	1	8 1/2	18	...	
Buffer caps	Buffers, rear of chassis	Wrought iron.	2	6	12 1/2	...	
Buffer plates	do	do	6	6	12 1/2	...	
Buffer cushions	do	Rubber	8	5 1/2	12	...	
Buffer bolts	do	Wrought iron.	4	1 1/2	11 1/2	8	
Bushings	Top carriage, gun lever axle beds.	Bronze, No. 1.	2	...	...	...	4 halves.
Do.	Upper end gun levers	do	2	...	...	...	Do
Do.	Lower end gun levers	do	2	...	...	...	Forced in place.
Do.	In hauling down sheaves	do	8	...	...	...
Cam	Elevating clamp	Steel	1	2.78	2 1/2	...	
Cap-squares	Gun levers	Forged steel, No. 3.	2	6	30	...	
Chassis, right-hand	On racer	Cast steel, No. 1	1	7 1/2	170	...	
Chassis, left-hand	do	do	1	7 1/2	170	...	
Chain-pulley brackets.	Under rear of traverse-wheel bracket.	Cast steel	2	...	...	...
Chain-pulley axles	In pulley brackets.	Forged steel	2	...	...	...	With split pins.
Chain pulleys	do	Wrought iron	2	8 1/2	...	...	Bronze bushed.
Clamp crank shaft.	Traversing-gear bracket.	Tobin bronze.	1	1	8 1/2	1	1 split pin.
Clamp vertical shaft.	do	Steel	1	2	2 1/2	...	
Counterweight hooks.	With carriage	do	2	...	...	...
Counterweight bottom plate.	Suspended from crosshead shaft.	Cast iron	1	46.5	6	...	
Counterweights	do	Lead	4	46.5	8	...	
Do.	do	do	1	46.5	11	...	
Do.	do	do	2	...	3	...	1 layer in 2 halves.
Do.	do	do	2	...	4	...	Do.
Do.	do	do	15	...	3	...	Top layer.
Crosshead pieces	On chassis vertical guides.	Cast steel	2	6 1/2	30	...	1 right-hand, 1 left-hand.
Crosshead liners	In crosshead pieces	Bronze	10	...	30	...	
Distance ring (inner).	Traverse rollers	Wrought iron.	1	7 1/2	4 1/2	...	
Distance ring (outer).	do	do	1	9 1/2	4 1/2	...	
Distance rings	Roller bushings, in traverse wheels.	Bronze	8	5 1/2	1 1/2	...	

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location	Material.	Number.	Diameter or width.	Length.	Notes.	Remarks.
Dust guards	Traverse-wheel axles...	Sheet steel...	16	In.	In.		82 half segments.
Do.....	At traversing worm wheel.	Sheet steel and cast iron.	1				
Elevating through shaft.	Through chassis.....	Forged steel, No. 2.	1	2½	98½	2	Collar and 2 washers.
Elevating-rack pinion shaft.	In chassis	Steel	2	2½	16½		
Elevating arms....	Connecting breech of gun to elevating racks.	Forged steel, No. 3.	2		119		
Elevating-arm caps.	Upper ends of elevating arms.	do	2	2½	12½		
Elevating spur wheels.	Elevating shaft.....	Cast steel.....	2	24½	3½		72 teeth, and graduated plate screwed on.
Elevating spur pinions.	Outer ends, elevating-rack pinion shaft.	Bronze	2	5½	8		15 teeth.
Elevating-rack guides.	Inside chassis	Gun iron	4	5½	62		
Elevating racks ...	do	Bronze, No. 3.	2	9	34½		1 right-hand, 1 left-hand.
Elevating-rack pinions.	Elevating racks	Forged steel..	2	9	2½		16 teeth.
Elevating hand-wheels.	At sides of chassis on elevating shaft.	Wrought iron, cast-iron hub.	2	40			
Elevating clamps..	At sides of chassis to elevating gear.	Cast steel.....	1				
Elevating-clamp bolt.	Elevating clamp	Wrought iron.	1 pair	1	16	2	With washer.
Elevating-clamp spring.	do	Steel	1				
Elevating-clamp pulley.	do	Cast iron	1	19½	3½		
Elevating-arm truss.	Between rear elevating arms.	Cast steel.....	1	27½	56.5		
Elevating band ...	On gun	Cast steel, No. 1	1	30	7		4 halves.
Elevating-arm boxes.	Upper ends rear elevating arms.	Bronze, No. 1.	2				
Elevation pointer.	At elevating spur wheel, right side of carriage.	Sheet brass...	1				2 dowel pins.
Emptying coupling.	Equalizing press pipe ...	Bronze	1		4½		
Emptying-coupling plug.	Emptying coupling	Wrought iron.	1	1	1		
Emptying-coupling straps.	do	do	2				
Emptying plug....	Traversing-worm pocket	Cast iron	1				½-inch gas tap.
Equalizing-pressure pipe.	Recoil cylinders.....	Copper	1				In two parts.
Equalizing-pressure pipe connections.	do	Steel	2				
Equalizing-pipe rings.	Emptying coupling	do	2	1½			Free on pipe.
Equalizing-pipe collars.	do	Brass	4	1½			Brased on pipe.
Equalizing-pipe straps.	Equalizing pipe	Wrought iron.	2	1½			
Extractors.....	For removing stuffing-box glands.	Steel	2		10		
Eyebolts.....	Upper-end gun levers...	Wrought iron.	2	2	8½		
Followers.....	Front stuffing boxes...	Bronze	2	6	5½		
Do.....	do	do	2	8½	3½		
Do.....	Emptying coupling	do	2		1½		
Fulcrums.....	For tripping bars...	Wrought iron.	2	1½	7½	2	
Fulcrum pins.....	At sides of chassis for pinch bar.	Steel.....	6	2	5½		
Gaskets.....	Front stuffing boxes...	Leather	2	8			
Do.....	Rear stuffing boxes...	do	2	12½			
Gears, miter.....	Traversing clamp	Bronze	4				12 teeth each.
Glands.....	Front stuffing boxes...	do	2				
Do.....	Rear stuffing boxes...	do	2				
Do.....	Equalizing-pressure pipe, outer ends.	Steel.....	2	1½	1		
Gun levers.....	Carrying gun.....	Cast steel, No 1.	2	6	124		

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter or width.	Length.	Nuts.	Remarks.
Gun-lever axle....	Uniting gun levers.....	Forged steel, No. 3.	1	$\frac{7}{16}$ 13	$\frac{7}{16}$ 54	...	
Handle.....	On right-hand side gun lever.	Wrought iron.	1				
Hand rail.....	On right-hand recoil cylinders.	do.	1				
Hauling-down ropes.	Gun levers to hauling-down drums.	Hemp.....	2				3-inch rope, with hook attached.
Hauling-down drums.	On traversing worm-shaft.	Cast iron.....	2	8	8		
Hinge brackets....	Traversing clamp.....	do.	2				
Hinge pins.....	do.	Steel.....	2	1	6		
Implement box....	With carriage.....	Ash.....	1	22	60		With lock and handles.
Ladder.....	Rear sighting platform..	Wrought iron.	1	13	70		
Ladder brace.....	do.	do.	1				
Lever.....	Elevating clamp.....	do.	1		20		
Leveling screws....	Traverse circle.....	Bronze, No. 3.	16	$\frac{3}{4}$	1		
Lifting bolts.....	For lifting cylinder heads and trunnion caps.	Wrought iron.	2	$\frac{1}{2}$	5		
Liners.....	On chassis at crosshead run.	Bronze.....	2		34		
Locking nut.....	Traversing-worm wheel.	do.	1				With spring click.
Name plate.....	On right chassis.....	do.	1				With two round-head screws.
Oil can.....	With carriages.....	Brass.....	1				1-quart.
Do.....	do.	do.	2				$\frac{1}{2}$ -pint.
Oil plugs.....	do.	do.	10				$\frac{1}{4}$ -inch tap.
Do.....	do.	do.	41				$\frac{1}{4}$ -inch tap.
Packing rings.....	Emptying coupling.....	Leather.....	2	1			
Pawl-spring thimbles.	At tripping pawls.....	Forged steel..	2				
Pawl stops.....	do.	Steel.....	2			2	
Pawls, stationary.....	do.	Forged steel, No. 3.	2		20		1 right-hand, 1 left-hand.
Pawls, movable.....	do.	do.	2		20		Do.
Pawlsprings.....	do.	Brass.....	4				
Pawl-spring covers	do.	Steel and brass	4	$\frac{1}{2}$	3		
Pins.....	Asimuth circle to traverse circle.	Bronze.....	4				
Pipe plugs.....	Filling and vent holes..	Brass.....	6				$\frac{1}{4}$ -inch pipe plugs.
Do.....	At rear stuffing boxes..	do.	2				Do.
Pin.....	Elevating-clamp straps..	Steel.....	1			2	1 1-inch nut, 1 $\frac{1}{2}$ -inch nut, and 1 washer.
Do.....	Elevating-clamp lever..	Forged steel, No. 2.	1			1	1 bronze washer.
Pistons and rods....	In recoil cylinders.....	Forged steel, No. 3.	2		140	4	With bronze liners.
Platform, chassis sight.	Rear of right chassis....	Wrought iron.	1	23	24		
Platform braces....	Chassis-sight platform..	do.	1				
Do.....	Trunnion platform.....	do.	pair				
Platform, trunnion sight.	On top carriage.....	do.	1	18	20		
Racer.....	On traversing rollers....	Cast steel, No. 1.	1	96	9		
Racer clip.....	On racer.....	Forged steel, No. 2.	1	9	24		
Railing, chassis sight.	Rear-sight platform.....	Wrought iron.	1			4	$\frac{1}{4}$ -inch and 1-inch pipe.
Ratchet levers.....	Hand levers to tripping pawls.	Forged steel, No. 2.	2		60		1 right-hand, 1 left-hand.
Ratchet cranks.....	Carrying tripping pawls.	Forged steel, No. 3.	2		10		Do.
Ratchet-crank pins.	In ratchet cranks.....	do.	2				
Recoil rollers.....	In upper part of chassis.	do.	18	8	5		Each bronze bushed.
Recoil-roller axles.	do.	do.	16	2	8		
Rollers (bushing)...	Traversing-wheel axle..	Steel.....	64	$\frac{1}{2}$	4		
Roller dust guard...	Around racer.....	Steel plate..	1	9			In 3 segments.
Screws, set.....	Elevating band.....	Steel.....	2	2	5		Special.
Screws, headless...	Ratchet crank pin.....	Wrought iron.	2	$\frac{1}{2}$			
Do.....	Crank-shaft collar.....	Steel.....	1	$\frac{1}{2}$			

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter or width.	Length.	Note.	Remarks.
Screws, round-head.	Name plate.....	Wrought iron.	2	In. 1	In. 1		
Do.....	Traversing-wheel dust guards.	do.....	160	1	1		
Do.....	Worm-wheel dust guard.	do.....	7	1	1		
Do.....	do.....	do.....	11	1	1		
Do.....	Traversing index finger.	do.....	2	1	1		
Screws, counter-sunk.	Grad. strip to elevating spur wheel.	Brass.....	24	1	1		
Do.....	Crosshead liner gibs.	Bronze.....	4	1	1		
Do.....	do.....	do.....	36	1	1		
Sheaves.....	At upper ends of gun levers and rear of chassis.	Cast iron.....	8				Bronze bushed.
Sheave shafts.....	In hauling-down sheaves.	Forged steel..	4	1 1/2	5 1/2		Each with taper pin.
Shot tongs.....	With carriage.	Steel.....	2				
Sight-binding screws.	Sight-standard caps.	Bronze.....	7				
Sight-standard caps.	On sight standard.....	Cast iron.....	2				
Sight standard....	On rear of right chassis..	Cast steel.....	1		35		
Sprocket wheel.....	Traversing-gear bracket.	Cast iron.....	1	9.5			
Sprocket-wheel shaft.	do.....	Steel.....	1		29 1/2		
Stationary pawl studs.	At tripping pawls.....	Forged steel, No. 3.	2				
Step.....	At fulcrum pin on right-hand side of chassis.	Steel.....	1				
Do.....	At right-hand side of chassis.	Wrought iron.	2				4
Stop plates.....	On elevating-rack guides.	do.....	2				
Stop pins.....	On elevating racks.....	do.....	2				
Stop nut.....	Sprocket-wheel shaft....	Steel.....	1				
Studs.....	Rear heads, recoil cylinders.	Wrought iron.	24	1	2 1/2		24
Do.....	At gun-lever cap.....	do.....	4	1 1/2	6 1/2		4
Do.....	At caps to elevating arms.	do.....	4	1	4		4
Stuffing boxes.....	Front ends, top carriage.	Bronze.....	2				
Do.....	Rear ends, top carriage.	do.....	2				
Suspension rods.....	Supporting counter-weight.	Forged steel, No. 3.	2	3 1/2	63 1/2		4
Suspension-rod shaft.	Through suspension rod.	do.....	1	6	49		
Taper pins.....	In hauling-down sheave shafts.	Steel.....	4				
Throttling bars.....	Recoil cylinders.....	Forged steel..	4				
Thrust plates.....	Under traversing circle leveling screws.	Steel.....	36	4	4		
Top carriage.....	On chassis.....	Gun iron.....	1	77	61		
Top carriage caps.	On top carriage.....	Cast steel, No. 1	2				
Traversing circle..	On platform.....	Gun iron.....	1	32	96		In 4 segments.
Traversing-circle joint plates.	Under traversing circle.	Steel.....	8				
Traversing-wheel stops.	On traversing circle.....	do.....	2				
Traversing rollers.	Between base ring and racer.	Forged steel, No. 3.	18	6	11 1/2		
Traversing wheels.	On traversing circle.....	Cast steel, No. 1	4	16			
Traversing-wheel axles.	In traversing wheels....	Forged steel, No. 3.	4	3 1/2	11 1/2		
Traversing-wheel transom.	Carrying rear of chassis.	Cast steel, No. 1	1	42	100		
Traversing-gear wheels.	At rear outside chassis.	Bronze.....	2	15.1			66 teeth.
Do.....	do.....	do.....	2	7.77			38 teeth.
Traversing-gear bracket.	On traversing-wheel transom.	Cast iron, No. 2	1	14 1/2	33		
Traversing-clamp jaws.	Traversing clamp.....	Cast steel.....	2	6	12		1 right-hand, 1 left-hand.
Traversing-clamp screw.	do.....	Steel.....	1		14 1/2		
Traversing-clamp crank.	Steel.....	Wrought iron.	1				With brass sleeve.
Traversing cranks.	Traversing-worm shaft..	do.....	2				Do.
Traversing worm..	Traversing-gear bracket.	Steel.....	1				
Traversing-worm wheel.	do.....	Bronze, No. 1	1	14 1/2	4		20 teeth.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter or width.	Length.	Nuts.	Remarks.
Traversing-worm shaft.	Rear of chassis	Steel.....	1	In.	In. 90		
Traversing-crank spindles.	....do .....	....do	2		20		
Traversing-index finger.	On right end of traversing-wheel transom.	Sheet brass	1				2 dowel pins.
Traversing chain.	Around traversing circle	Wrought iron.	1				With take-up bolt and clevis.
Traversing-chain eyebolts.	In traversing circle .....	....do	2				
Transom, front....	Between chassis.....	Cast steel, No. 1	1	29	52		
Transom, rear....	....do .....	....do	1	42	52		
Tripping bars....	With carriage	Steel.....	2		54		
Tripping-bar hooks.	On outside of chassis....	Wrought iron.	4				
Washers.....	On hauling down sheave shafts.	Forged steel	4				
Do.....	Elevating rack trunnion	Bronze	2	5½	1		1½-inch hole.
Do.....	At chain pulley brackets	Steel.....	2	3½	1		With dowel pins.
Do.....	Elevating clamp	Wrought iron.	1	8	1		1½-inch hole.
Wire netting	Rear sighting platform....	....do	1				
Wrench	For rear stuffing box	Steel.....	1				
Do.....	For rear stuffing-box follower.	....do	1				
Do.....	For front stuffing box .....	....do	1				
Do.....	For cylinder-head nuts....	....do	1		12		
Do.....	For suspension-rod nuts....	....do	2		42		
Wrench, double....	For ½-inch and ¾-inch nuts.	....do	1				
Do.....	For ¾-inch and 1-inch nuts.	....do	1				
Do.....	For 1-inch and 1½-inch nuts.	....do	1				
Do.....	For 1½-inch and 1¾-inch nuts.	....do	1				
Wrench, single....	For 2-inch nuts.....	....do	1				
Do.....	For piston-rod nuts.....	....do	2				
Wrench, connection.	For assembling equalizing pipe connection.	Wrought iron.	1		11		

AMMUNITION TRUCK.

[Three trucks for each carriage.]

(Seven shot-tongs for each carriage.)

(Price of separate truck each \$66.34.)

(Price of shot-tongs each \$7.92.)

Adjusting sleeve..	On rear elevating screw.	Bronze	1	3½	9		
Adjusting hand-wheels.	....do .....	....do	1				
Ball bearings.....	Caster yokes.....	Steel	2				19 steel balls ¾ inch and bronze cover.
Do.....	Elevating wheel hub....	....do	1				15 steel balls ½ inch and bronze cover.
Do.....	....do .....	....do	1				24 steel balls ½ inch and bronze cover.
Bolts	Caster bracket.....	Wrought iron.	4	1	1.6	4	
Do.....	....do .....	....do	2	1	1½		
Do.....	Front axle.....	....do	3	1	2½	3	
Cartridge shelves.	On sides of truck	Steel.....	2				
Cartridge-shelf supports.	Under front ends of cartridge shelves.	....do	2				1 by 1 by ½ inch angle.
Do.....	Rear ends of cartridge shelves.	....do	2		4½		1½ by 1½ by ¾ inch angle.
Caster wheels	Rear of truck.....	Cast steel.....	2				
Caster yokes.....	Caster wheels .....	....do	2			2	
Caster brackets....	Connecting caster yoke to body of truck.	....do	2				1 right-hand, 1 left-hand.
Caster pins	Through caster yokes....	Steel.....	2		4, 15	2	2 split pins.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

AMMUNITION TRUCKS—Continued.

Name of part.	Location.	Material.	Number.	Diameter or width.	Length.	Nuts.	Remarks.
				In.	In.		
Crank	On left side of body of truck.	Wrought iron.	1				With brass sleeve.
Crank shaft	Through upper part of body of truck.	Steel	1				
Crank-shaft bushing.	Bearing crank shaft.....	Bronze	2				
Elevating screws ..	Carrying shot tray	Steel	2				1 right-hand, 1 left-hand.
Elevating wheel ..	On adjusting sleeve.....	Bronze	1				32 teeth, $\frac{3}{4}$ -inch bore.
Do.....	On front elevating screw	do	1				32 teeth, hub threaded.
Elevating pinion ..	On crank shaft	Steel	1				16 teeth and 2 $\frac{1}{4}$ -inch set screws.
Filling-in piece ..	At hinge for handles	Wrought iron.	2				
Filler piece	Rear end of shot tray	Cast steel	1				
Filler-piece hinge ..	do	do	1				
Filler-piece hinge pin.	do	Steel	1				With split pins.
Frame	Forming body of truck ..	Wrought iron.	1				14 by 14 by $\frac{3}{8}$ inch angle iron.
Do.....	Under supporting shelves.	do	2				14 by 14 by $\frac{3}{8}$ inch angle iron.
Front wheels.....	On front axle	Cast steel	2				
Front axle	At base of truck	Steel	1			2	2 washers, 2 split pins.
Handle.....	At rear of truck	Wrought iron and wood.					1 pair.
Hinges	Connecting handles.....	Wrought iron.	2				1 right-hand, 1 left-hand.
Hinge pin	do	do	1		12		2 washers, 2 split pins.
Nuts	On caster yokes	do	2	1	1	2	2 washers.
Do.....	On caster pins	do	2	1	2	2	2 split pins.
Do.....	Front axle	do	2	1	2	2	Do.
Do.....	On crank shaft	do	1	4	1	1	
Oil plugs	Front-wheel hubs	Bronze	2				0.375-inch tap.
Do.....	Caster wheels	do	2				Do.
Do.....	Caster yokes	do	2				Do.
Reinforcing ring ..	In top plate	Forged steel ..	1	7			
Do.....	do	do	1	4			
Roller bearing ..	Caster-wheel hubs	Steel and bronze.	2	11	21		
Do.....	Front-wheel hubs	do	2	11	21		
Screws, headless ..	Elevating pinion	Steel	2		.96		
Screws, round-head.	Adjusting handwheel stop.	Brass	2				
Do.....	Ball-bearing cover	Wrought iron.	6		.2		
Do.....	do	do	6				
Shot tray	On elevating screws	do	1				
Shot-tray pins.....	Connecting shot tray to elevating screws.	Bronze	2	1	44		2 split pins.
Stop	Adjusting sleeve	Steel	1	4	6		
Do.....	Adjusting handwheel	do	1		14		
Supporting shelf ..	In top plate	do	1				Bored 1.85 inches diameter.
Do.....	do	do	1				Bored $3\frac{1}{8}$ inches diameter.
Top plate.....	Top of body of truck	do	1				

8-INCH DISAPPEARING CARRIAGE, L. F., MODEL 1896.

(Price \$9728.81.)

Weights of the principal parts of carriage.

Name.	Weight.
	<i>Pounds.</i>
Base ring.....	a 10,200
Racer.....	a 7,600
Top carriage.....	a 4,950
Chassis, each.....	a 5,000
Distance rings, complete.....	a 1,300
Transom.....	a 900
Crosshead.....	a 2,100
Elevating arms.....	a 1,100
Gun lever, each.....	a 2,100
Gun-lever axle.....	a 1,200
Elevating racks, each.....	a 280
Elevating-rack guides, each.....	a 140
Traverse rollers, each.....	64
Set recoil rollers, one side.....	408
Suspension rods, each.....	250
Bottom plate.....	1,300
Receptacles for chains, each.....	32
One chain.....	64
Sight standard.....	96
Worm-wheel casing.....	a 210
Piston rods, each.....	310
Implement box and contents.....	312
Rear-sight platform.....	250
Lead weight.....	26,945
Total estimated weight of carriage.....	91,791
Estimated weight of three ammunition trucks.....	1,298
Total weight.....	93,084

a Estimated.

List of the parts of carriage, location, material, correct nomenclature, etc.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				<i>In.</i>	<i>In.</i>		
Adjusting nuts.....	On worm-wheel shaft.....	Steel.....	2			2	
Asimuth circle.....	On base ring.....	Brass.....	1				In 6 sections.
Asimuth circle dust guard.....	On racer.....	do.....	1				Do.
Asimuth pointer.....	do.....	do.....	1				With 2 dowel pins, 0.125 inch diameter.
Ball thrust bearing.....	In worm-wheel casing.....	Steel and bronze.....	1				180 half-inch balls (steel).
Base ring.....	On platform.....	Cast iron.....	1				
Bolts.....	Dust guard to racer.....	Wrought iron.....	48	.5	1		
Do.....	Dust guard joints.....	do.....	48	.5	6.25		
Do.....	Traversing gear bracket.....	do.....	3	1	2.5		
Do.....	Distance-ring joints.....	do.....	20	1.75	2.5		
Do.....	Racer clip to racer.....	do.....	4	1.25	8.75		
Do.....	Pawl-spring bracket.....	do.....	4	.75	1.75		
Do.....	Chassis to racer.....	do.....	42	1.25	4		
Do.....	Handle on right gun lever.....	do.....	2	.75	1.5		
Do.....	Floor plates to chassis.....	do.....	10	1	2		
Do.....	Suspension-rod nuts.....	do.....	8	.75	3.5		
Do.....	Retaining-pawl springs.....	do.....	4	.5	1		
Do.....	Emptying coupling and equalizing pipe straps.....	do.....	6	.5	1		
Do.....	Floor plates to base of chassis.....	do.....	10	1	2		
Do.....	Throttling bars to recoil cylinders.....	do.....	28	.75	2.55		Special, with lead washers.
Do.....	do.....	do.....	4	.75	8.15		Do.
Do.....	Retraction chain pipe-brackets.....	do.....	4	.5	1.25		
Do.....	Receptacle for chain.....	do.....	8	.75	1.25		
Do.....	Piston-rod brackets to chassis.....	do.....	4	1	3.25		

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				<i>In.</i>	<i>In.</i>		
Bolts	Sight-standard caps.	Wrought iron.	8	.5	1.5		
Do.	Transom to chassis.	do.	12	1.25	3.25		
Do.	Sprocket-wheel shaft bracket.	do.	4	1.25	2.75		
Do.	Elevating-shaft bracket.	do.	2	1	2.5		
Do.	Worm-wheel casing cap.	do.	2	1.25	4.25		
Do.	Worm-wheel casing to racer.	do.	4	1.25	8.25		
Do.	Sighting-platform ladder.	do.	4	1	2		
Do.	Steps on chassis.	do.	4	1	2.25		
Do.	Top carriage platform.	do.	4	.75	1.5		
Do.	Recoil buffer brackets to chassis.	do.	4	1.75	9.5	4	
Do.	do.	do.	8	1.25	9	8	
Do.	Elevating band.	do.	2	1.75	14	2	
Do.	Sighting-platform ladder.	do.	2	1	4	2	
Buffer-spring bolts	Buffer to elevating racks.	do.	2			4	
Buffer springs	do.	Steel.	2				
Bushing	Traversing-gear bracket.	Bronze	1				
Do.	In racer, at traversing-shaft bearing.	do.	1				
Do.	In lower ends, gun levers.	do.	2				
Bushings	Upper ends, gun levers.	do.	2				
Do.	Right-hand chassis.	do.	6				
Do.	Left-hand chassis.	do.	4				
Do.	Gun-lever axle bearings.	do.	2				4 halves.
Do.	Recoil roller frames.	do.	48				
Do.	Elevating-shaft bracket.	do.	2				
Do.	Worm-wheel casing.	do.	1				
Do.	Elevating arm, lower end.	do.	2				
Chain pulley axles.	Recoil buffer bracket.	Steel.	2				Each with washer and split pin.
Chain stripper	Sprocket-wheel shaft bracket.	do.	1				On right side.
Do.	Inside of left chassis.	do.	1				On left side.
Chassis	On racer.	Cast iron.	2				Right and left sides.
Collar	Handwheel shaft.	Steel.	1				With 0.5-inch set screw.
Do.	Traversing shaft.	do.	1				Do.
Counterweights	Suspended from crosshead.	Cast lead.	26				Top group.
Do.	do.	do.	4				Second layer.
Do.	do.	do.	5				Similar.
Do.	do.	do.	1				Third layer.
Counterweight bottom plate.	do.	Cast iron.	1				
Counterweight handles.	In detachable pieces.	Wrought iron.	26				
Counterweight hooks.	With carriage.	Steel.	2				
Counter recoil buffers.	Inside rear cylinder heads.	Bronze.	2				
Crosshead	Connecting counterweight to gun levers.	Cast steel.	1				
Crosshead liners.	In crosshead at base of gun levers.	Tobin bronze.	16				
Direction plates for traversing.	On sides of chassis.	Bronze.	2				1 right hand, 1 left hand.
Direction plates for retraction.	do.	do.	2				Do.
Direction plates for elevation.	do.	do.	2				Do.
Distance ring	At traversing rollers, inner ends.	Wrought iron.	1				In halves.
Do.	At traversing rollers, outer ends.	do.	1				Do.
Dust guard	For traversing rollers.	Steel plate.	1				
Elevation disks.	At sides of chassis on ends of worm-wheel shaft.	Cast iron.	2				In 6 sections.
Elevation pointers.	On outside of chassis at elevation disks.	Brass.	2				
Elevating hand-wheels.	At sides of chassis on end of elevating shafts.	Cast and wrought iron.	2				
Elevating arm	Connecting breech of gun to elevating racks.	Cast steel.	1				

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Elevating-arm boxes.	Upper end of elevating arm.	Bronze	2	In.	In.		4 halves.
Elevating band....	On breech of gun.....	Cast steel.....	1				
Elevating-band set screws.	Elevating-band trunnions.	Steel.....	2				
Elevating racks...	On guides on chassis....	Cast steel.....	2				1 right-hand, 1 left-hand.
Elevating-rack guides.	Bolted to chassis	Bronze	2				
Elevating-rack stops.	On inside of chassis	Steel.....	2				
Elevating-rack buffers.	Below elevating racks ..	Wrought iron..	2			2	2 steel washers.
Elevating pinions.	On worm-wheel shaft....	Bronze	2				20 teeth.
Elevating miter gears.	On hand-wheel shaft and on worm shaft.	Steel.....	2				18 teeth.
Elevating-shaft bracket.	On transom.....	Cast iron	1				2 bronze bushings.
Emptying coupling.	Equalizing pipe	Bronze	1				
Emptying-coupling straps.	Securing emptying coupling to top carriage.	Wrought iron..	2				
Emptying plug....	Emptying coupling.	....do....	1				
Equalizing pipe...	At front of top carriage, connecting recoil cylinders.	Copper	1				In 2 parts.
Equalizing-pipe collars.	On ends of equalizing pipe.	Brass	4				Brased on pipe.
Equalizing-pipe rings.	....do.....	Steel.....	4				Free.
Equalizing-pipe followers.	Connecting equalizing pipe to emptying coupling and recoil cylinders.	Bronze	2				
Equalizing-pipe straps.	Securing equalizing pipe to top carriage.	Wrought iron..	2				
Extractor	For gun lever and suspension-rod pins.	Steel.....	1				
Eyebolts.....	In gun-lever caps	Wrought iron..	2				
Do.....	In top carriage cap-square.	....do....	2				
Do.....	In worm-wheel casing, upper half.	....do....	1				
Friction clamp....	On worm-wheel shaft....	Cast steel.....	1				
Filling plugs.....	On top of recoil cylinders.	Bronze	6				
Floor plates	On racer.....	Steel.....	2				1 right-hand, 1 left-hand.
Graduation strips.	Around elevation disks.	Brass	2				
Guide pulleys	Below sprocket wheels..	Cast iron	2				Bronze bush in each.
Guide-pulley axle.	Attached to sprocket-wheel shaft bracket.	Steel.....	1				With washer and split pin.
Do.....	Attached to left chassis.	....do....	1				Do.
Gun levers	Carrying gun.....	Cast steel.....	2				1 right-hand, 1 left-hand.
Gun-lever caps....	At upper ends of gun levers.	Forged steel..	2				
Gun-lever axle....	Uniting gun levers .....	....do....	1				
Gun-lever pins....	Crosshead to gun levers.	....do....	2				
Handle.....	On upper side of right-hand gun lever.	Wrought iron..	1				
Handwheel shaft..	Through chassis, elevating gear.	Steel.....	1				With keys.
Hooks	At upper ends of gun levers.	Wrought iron..	2				
Implement box....	With carriage	Ash.....	1				
Leveling screws...	In base ring, for leveling.	Bronze	12	1.75	3.25		
Name plate.....	On right chassis .....	....do....	1				
Oil plugs	Bearings in carriages....	....do....	—				0.625-inch tap and 0.875-inch tap.
Oil can, with valve.	With carriage	Brass	1				1 quart.
Oil cans .....	....do.....	....do....	2				1 pint.
Packing rings....	Filling plugs	Leather	6				
Do.....	Equalizing pipe joints..	....do....	4				
Do.....	Front stuffing boxes, top carriage.	....do....	2				
Pawls	Front of chassis, for crosshead.	Forged steel..	2				
Pawl-spring brackets.	Retaining pawls.....	Wrought iron..	2				

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				In.	In.		
Pawl stops.....	Retaining pawls.....	Steel.....	2	1.125	4.25		
Pawl fulcrums.....	do.....	Forged steel..	2			2	
Pawl springs.....	do.....	Steel.....	2				
Pistons and rods...	In recoil cylinders.....	Forged steel..	2				
Piston liners.....	In pistons, recoil cylinders.....	Bronze.....	8				
Piston-liner pins...	In piston liners, cylinder.....	Steel.....	16				
Piston-rod nuts.....	Front end of piston rods.....	Forged steel..	4	2.5		4	Right-hand.
Piston-rod bracket.	On top of chassis.....	Cast steel.....	1				Left-hand.
Do.....	do.....	do.....	1				
Racer.....	On traversing rollers.....	do.....	1				
Racer clips.....	On racer.....	do.....	2				
Ratchet wheel.....	On retraction crank shaft.....	Steel.....	1				9 teeth.
Ratchet pawl.....	On pawl pin attached to chassis.....	do.....	1				
Ratchet-pawl pin...	On chassis.....	do.....	1				
Ratchet-pawl stop.	do.....	do.....	1	.5	8		
Retraction spur gear.	On retraction sprocket-wheel shaft.....	Cast steel, No. 1	1				60 teeth.
Do.....	On outside of right chassis.....	do.....	1				56 teeth.
Retraction spur pinion.	On inside of right chassis.....	Forged steel..	1				12 teeth.
Retraction-shaft handwheel.	On retraction shaft.....	Bronze.....	1				
Retraction chain nut tighteners.	With carriage.....	Steel.....	2				
Retraction chains.	From gun levers to retraction drums.....	Wrought iron..	2				
Retraction swivels.	At ends of retraction chains.....	do.....	2				
Retraction eyebolts.	In chain swivels.....	do.....	2			4	Round nuts.
Retraction pipes...	From recoil buffer bracket to drum.....	do.....	2				
Retraction chain-pipe supports.	Supporting front ends of retraction chain pipe.....	do.....	2			4	
Retraction chain-pipe brackets.	On recoil buffer brackets.....	Cast iron.....	2				1 right-hand, 1 left-hand.
Retraction chain pulleys.	At rear of top of chassis.....	do.....	2				
Retraction sprocket wheels.	On retraction sprocket-wheel shaft.....	do.....	2				Do.
Retraction crank shaft and pinion.	Through chassis.....	Forged steel..	1				With coupling, keys, and pins.
Retraction sprocket-wheel shaft.	do.....	do.....	1				With 2 keys.
Recoil rollers.....	On top of chassis.....	do.....	24				
Recoil buffer brackets.	On chassis.....	Cast steel.....	2				
Recoil buffer caps.	Recoil buffer.....	Wrought iron..	2				
Recoil buffer plates.	Recoil buffers.....	do.....	10				
Recoil buffer cushions.	do.....	Balata.....	12				
Recoil buffer-cap bolts.	do.....	Steel.....	4	.75	11.25	4	With split pins.
Receptacles for chains.	Below chain drums.....	Wrought iron..	2				
Roller bearings...	In retraction chain pulleys.....	Steel and bronze.	2	1.5	3		
Do.....	Retraction sprocket-wheel shaft bearings.....	do.....	1	2.25	4.5		
Do.....	do.....	do.....	2	2.5	5		
Roller dust guards.	do.....	Steel and felt.	2				2.55 bore.
Do.....	do.....	do.....	1				2.8 bore.
Roller frame side pieces.	Embracing recoil rollers.....	Forged steel..	4				
Roller frame end pieces.	At ends of roller frame.....	do.....	4				
Roller frame pins.	Through end pieces.....	Steel.....	4				
Roller frame stays.	Between sides of recoil roller frame.....	do.....	22				
Screw-drivers.....	With carriage.....	do.....	2				1 with wood handle.
Screws, cheese head.	Training rack to base ring.....	Wrought iron..	54	.5	1.125		
Do.....	Roller-bearing dust guard.....	do.....	9	.375	1.85		
Do.....	Elevating rack guides.....	Steel.....	20	1			

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Notes.	Remarks.
Screws, counter-sunk.	Asimuth circle	Brass	56	In. 0.25	In. 0.5		
Do.	Asimuth dust guard	do	6	.25	.6		
Do.	Oil holes in racer	do	8	.625	.75		
Do.	Crosshead liners	do	24	.625	1		
Do.	do	do	4	.625	1.25		
Do.	do	do	4	.625	2.5		
Do.	Liners for gun trunnions	do	16	.6	1.25		
Do.	Gun-lever axle-bed bushings.	do	16	.75	1.25		
Do.	Top-carriage liners	do	40	.375	.75		
Do.	do	do	6	.375	2.25		
Do.	Direction plates	do	16	.25	.6		
Do.	Roller-bearing dust guard.	Wrought iron.	9	.25	.5		
Do.	Elevation graduation strips.	Brass	20	.25	.5		
Do.	Top-carriage platform	Wrought iron.	3	.75	1.75	3	
Do.	Screen of sighting-platform guard.	do	8	.375	.25		
Screws, roundhead	Asimuth pointer	Brass	2	.25	.75		
Do.	Elevation pointers	do	4	.5	1		
Do.	Name plate	do	2	.25	.8		
Do.	Side-covering plates on worm-wheel casing.	do	10	.25	.6		
Do.	Ball-thrust bearing cover	do	3	.125	.25		
Screws, headless	Securing gun-lever pins and suspension-rod pins in crosshead.	Wrought iron.	4	.75	1		
Do.	Traversing pinion shaft.	do	2	.5	.75		
Do.	Traversing intermediate shaft.	do	2	.5	.75		
Do.	Securing stays in roller frame.	do	60	.5	.9		
Do.	Retraction-spur gear hub.	do	1	.5	.75		
Do.	Worm-wheel shaft bushing.	do	1	.5	.75		
Do.	Hubs of handwheels and elevation disks.	do	4	.5	.75		
Screws, headless, set.	Retraction-shaft hand-wheel.	Steel	1	.5	.6		
Do.	Worm-shaft bushing	do	1	.5	.75		
Do.	Traversing crank-shaft collar.	do	1	.5	1.25		
Set screws (hexagonal head).	Retraction-chain pipe bracket.	do	2	.5	.75		
Do.	Thrust collar on worm-wheel shaft.	Wrought iron.	1	.75			
Separators	Between distance rings.	Cast iron	12				
Separator bolts	Through separators	Wrought iron.	12	1	11.55	12	
Shot tongs	With carriage	Steel	7				
Side-covering plates.	Worm-wheel casing	do	2				Half rings.
Sight standard	On right-hand piston-rod bracket.	Cast steel	1				
Sight-standard caps	On sight standard	Cast iron	2				
Sight-bracketbinding screws.	Sight-standard caps	Wrought iron.	2				
Sight-standard platform.	Rear of right chassis	do	1				
Sight-standard platform braces.	do	do	2				1 pair.
Sight-standard platform ladder.	do	do	1				
Sight-standard platform ladder braces.	do	do	2				Do.
Sight-standard platform guard rail.	On sight-standard platform.	do	1			8	0.75 and 1 inch pipe, screen and fittings.
Spanner wrench	With carriage	Steel	1				
Sprocket-wheel shaft bracket.	Under transom, to right chassis.	Cast steel	1				
Stops	In base ring to limit traversing of carriage.	Steel	2				
Step	On outside of right chassis.	Wrought iron.	1				
Do.	On outside of left chassis.	do	1				

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Studs.....	Gun-lever caps.....	Wrought iron.	4	In. 1.75	In. 8	8	4 1.75 inches high; 4 1 inch high.
Do.....	Top-carriage cap-squares.....	do.....	4	1.5	8.5	4	
Do.....	Rear cylinder heads.....	do.....	24	.75	3.2	24	
Do.....	Elevating-arm caps.....	do.....	4	1	8	8	
Stuffing boxes.....	Front ends of recoil cylinders.....	Bronze.....	2				
Stuffing-box followers.....	do.....	do.....	2				
Stuffing-box glands.....	do.....	do.....	2				4 halves.
Stuffing-box heads.....	Rear ends of recoil cylinders.....	Cast steel.....	2				
Stuffing-box followers.....	do.....	Bronze.....	2				
Stuffing-box glands.....	do.....	do.....	2				Do.
Suspension rods.....	Crosshead.....	Steel.....	2				
Suspension nuts.....	Suspension rods.....	Forged steel.....	2				Do.
Throttling bars.....	In recoil cylinders.....	do.....	4				
Thrust plates.....	Under base ring, for leveling screws.	Steel.....	12				
Thrust washer.....	Friction clamp, on worm-wheel shaft.	Balata and bronze.	1				6 parts.
Thrust collar.....	Worm-wheel hub.....	Steel.....	1				With set screw.
Thrust disk.....	In worm-wheel casing.....	do.....	1				
Top carriage.....	On chassis.....	Cast iron.....	1				
Top-carriage cap-squares.....	On top carriage.....	Cast steel.....	2				
Top-carriage liners.....	Between top carriage and chassis.	Bronze.....					10 pieces.
Top-carriage ladder braces.....	Ladder to top carriage ..	Wrought iron.....					1 pair.
Top-carriage platform.....	On right recoil cylinder.....	do.....	1				
Top-carriage platform rail.....	On top-carriage platform.....	do.....	1			2	
Top-carriage platform braces.....	Platform to top carriage.....	do.....	2				
Top-carriage platform ladder.....	Top-carriage platform.....	do.....	1				
Training rack.....	Attached to base ring ..	Forged steel.....	1				260 teeth in 6 pieces.
Transom.....	Between chassis.....	Cast steel.....	1				
Traversing cranks.....	On traversing crank shaft.	Forged steel.....	2				Handles with brass sleeves.
Traversing crank shaft.....	Across front of chassis.....	Steel.....	1				With key.
Traversing pinion shaft.....	At front end of right chassis, vertical.	do.....	1				With key and headless screw.
Traversing intermediate shaft.....	At front end of right chassis, horizontal.	do.....	1				
Traversing gear.....	On outer end of traversing intermediate shaft.	Bronze.....	1				44 teeth, key, and headless screw.
Traversing pinion.....	On traversing shaft.....	Steel.....	1				18 teeth.
Do.....	Gearing into traversing rack.	Bronze.....	1				12 teeth.
Traversing-gear bracket.....	On racer.....	Cast iron.....	1				
Traversing bevel gear.....	On top of traversing pinion shaft.	Bronze.....	1				80 teeth.
Traversing bevel pinion.....	On inner end of traversing intermediate shaft.	Steel.....	1				15 teeth.
Traversing rollers.....	Between base ring and racer.	Forged steel.....	24				
Tripping bars.....	With carriage.....	Steel.....	2				
Tripping-bar safety latches.....	On safety-latch stud.....	do.....	2				
Tripping-bar safety-latch studs.....	On chassis.....	do.....	2			2	With 2 washers.
Tripping-bar safety-latch stops.....	do.....	do.....	2				
Tripping-bar hooks.....	On sides of chassis.....	Wrought iron.....	4				
Worm wheel.....	On worm-wheel shaft ..	Bronze.....	1				20 teeth.
Worm-wheel shaft.....	Through chassis.....	Forged steel.....	1				With keys.
Worm-wheel casing.....	On rear of racer.....	Cast iron.....	1				In 2 parts.
Worm and shaft.....	Elevating gear.....	Forged steel.....	1				With keys.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Wrench	For cylinder heads	Steel	1	In.	In.		
Do	For piston-rod nuts	do	2				
Wrench, double	For $\frac{1}{2}$ and $\frac{3}{4}$ inch nuts	do	1				
Do	For 1 and $1\frac{1}{2}$ inch nuts	do	1				
Do	For $1\frac{1}{2}$ and 2 inch nuts	do	1				

AMMUNITION TRUCK.

(Price of ammunition truck, separate, each \$149.37.)

(Price of shot tongs, \$7.92 each.)

[Three trucks for each carriage.]

(Shot tongs, 7 per carriage.)

Adjusting sleeve ..	On rear elevating screw ..	Bronze	1	$3\frac{1}{2}$	9		
Adjusting hand-wheel ..	do	do	1				
Ball bearings	Caster yokes	Steel	2				19 steel balls, $\frac{1}{4}$ -inch, and bronze cover.
Do	Elevating-wheel hub	do	1				15 steel balls, $\frac{1}{4}$ -inch, and bronze cover.
Do	do	do	1				24 steel balls, $\frac{1}{4}$ -inch, and bronze cover.
Bolts	Caster bracket	Wrought iron ..	4	$\frac{1}{2}$	1.6	4	
Do	do	do	2	$\frac{1}{2}$	1 $\frac{1}{2}$		
Do	Front axle	do	8	$\frac{1}{2}$	2 $\frac{1}{2}$	3	
Cartridge shelves ..	On sides of truck	Steel	2				
Cartridge supports ..	Under front ends of cartridge shelves ..	do	2				1 by 1 by $\frac{1}{4}$ inch angle.
Do	Rear ends of cartridge shelves ..	do	2		4 $\frac{1}{2}$		$1\frac{1}{2}$ by $1\frac{1}{2}$ by $\frac{1}{4}$ inch angle.
Caster wheels	Rear of truck	Cast steel	2				
Caster yokes	Caster wheels	do	2			2	
Caster brackets	Connecting caster yoke to body of truck ..	do	2				1 right-hand, 1 left-hand.
Caster pins	Through caster yokes ..	Steel	2		4.15	2	2 split pins.
Crank	On left side of body of truck ..	Wrought iron ..	1				With brass sleeve.
Crankshaft	Through upper part of body of truck ..	Steel	1				
Crank-shaft bushings ..	Bearing crank shaft ..	Bronze	2				
Elevating screws ..	Carrying shot tray	Steel	2				1 right-hand, 1 left-hand.
Elevating wheel ..	On adjusting sleeve	Bronze	1				32 teeth, $3\frac{1}{2}$ -inch bore.
Do	On front elevating screw ..	do	1				32 teeth, hub threaded.
Elevating pinion ..	On crank shaft	Steel	1				15 teeth, and 2 $\frac{1}{4}$ -inch set screw.
Filling-in pieces ..	At hinge for handles	Wrought iron ..	2				
Filler piece	Rear end of shot tray	Cast steel	1				
Filler-piece hinge ..	do	do	1				
Filler-piece hinge pin ..	do	Steel	1				With split pin.
Frame	Forming body of truck ..	Wrought iron ..	1				$1\frac{1}{2}$ by $1\frac{1}{2}$ by $\frac{1}{4}$ inch angle iron.
Do	Under supporting shelves ..	do	2				$1\frac{1}{2}$ by $1\frac{1}{2}$ by $\frac{1}{4}$ inch angle iron.
Front wheels	On front axle	Cast steel	2				
Front axle	At base of truck	Steel	1			2	2 washers, 2 split pins.
Handles	At rear of truck	Wrought iron and wood ..					1 pair.
Hinges	Attaching handles	Wrought iron ..	2				1 right-hand, 1 left-hand.
Hinge pin	do	do	1		12		2 washers, 2 split pins.
Nuts	On caster yokes	do	2	1	1	2	2 washers.
Do	On caster pins	do	2	1	$\frac{1}{2}$	2	2 split pins.
Do	Front axle	do	2	1	$\frac{1}{2}$	2	Do.
Do	On crank shaft	do	1	$\frac{1}{2}$	$\frac{1}{2}$	1	

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

AMMUNITION TRUCK—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				In.	In.		
Oil plugs	Front-wheel hubs	Bronze	2				0.875-inch tap.
Do.	Caster wheels	do	2				Do.
Do.	Caster yokes	do	2				Do.
Reinforcing ring ..	In top plate	Forged steel ..	1	7			
Do.	do	do	1	4½			
Roller bearings ..	Caster-wheel hubs	Steel and bronze.	2	1½	2½		
Do.	Front-wheel hubs	do	2	1½	2½		
Screws, headless ..	Elevating pinion	Steel	2		.95		
Screws, roundhead ..	Adjusting handwheel stop.	Brass	2		½		
Do.	Ball-bearing cover	Wrought iron ..	6		.2		
Do.	do	do	6		½		
Shot-tray	On elevating screws	do	1				
Shot-tray pins	Connecting shot tray to elevating screws.	Bronze	2	1	4½		2 split pins.
Stop	Adjusting sleeve	Steel	1		.6		
Do.	Adjusting handwheel	do	1		1½		
Supporting shelf ..	In top plate	do	1				Bored 1.85 inches diameter.
Do.	do	do	1				Bored ¾ inches diameter.
Top plate	Top of body of truck	do	1				

SPARE PARTS FOR CARRIAGES.

The following spare parts for 8-inch carriages are issued to the service, to wit:

	Price.			
	Dis. 1894.	Dis. 1896.	Barb. 1892.	
1 set gaskets per carriage, small.....	per set..	\$2.00	\$2.00	\$3.16
1 set gaskets per carriage, large.....	per set..	2.50	2.80	2.50
1 set filling plugs per carriage.....	each..	.17	.60	.25
1 set vent plugs per carriage.....	each..	.75	.50	
1 set springs (buffer).....	each..		5.50	
Brake-lever spring.....				
Crosshead pawl spring.....				
Pawl safety-latch spring.....				
Ratchet ball-bearing spring.....				
1 set compression grease-cup springs.....	each..	.57	.57	
1 set hydraulic packing per carriage (9 pounds per set).....	per pound.	.50	.50	
1 set oil-hole plugs per carriage.....	each..	.10	.25	.10
1 set elevation-pointer dowels per carriage.....	each..		.10	
1 set throttling-bar bolts per post.....	each..	.45	.13	.75
1 set rear stuffing-box studs per post.....	each..	.81	.86	
1 set elevation-pointer screws per post.....	each..	.07	.10	.25
1 set taper pins per post.....	each..	.25	.28	.25
1 set taper keys per post.....				
1 set slit pins per each model of carriage.....	each..	.25	.10	.02
1 set roller bearings per each model of carriage.....				
1 set wire retraction ropes per each model of carriage.....	each..	2.90	4.80	
1 set parts of equalizing and pipe throttling device, complete per each model of carriage.....				
1 set bolts for rope clamp per each model of carriage.....	each..		.10	
1 set screws for floor plates per each model of carriage.....	each..		.08	
1 set clamp screws for sight holder per each model of carriage.....	each..	.50	.50	
1 set dust-guard bolts per each model of carriage.....	each..	.08	.10	.05
1 set platform-ladder bolts per each model of carriage.....	each..		.14	
1 set screws for platform.....	each..	.25		.17
1 set springs each model ammunition truck, per post.....	each..	.25	.25	
1 set rivets for same, per post.....	per set..	1.40		
1 handle for ammunition truck.....	each..	1.25		
1 set extractors for cylinder heads, each model, per post.....	each..	.50	.50	
1 set extractors for stuffing boxes, each model, per post.....				.50
1 set traversing stops, per each model, per post.....	each..	.50	3.00	2.50
1 set elevating stops, per each model, per post.....	each..	.50	3.00	
1 set crosshead-pawl stops, per each model, per post.....	each..	.50	.50	

* Elevation scale screw.

	Price.		
	Dia. 1894.	Dia. 1896.	Barb. 1898.
1 set safety-latch stops, per each model, per post.....		\$0.50	
1 set stops for elevating clamps, per each model, per post.....	\$0.25		
1 set emptying plugs for each model barbette carriage, per post.....			\$0.25
1 set Yale locks No. 868 (Standard padlock), per post.....	1.00	1.00	
1 set drain plugs for elevating and traversing brackets and casings, each model, per post.....	.25	.40	
1 set Balata washers, each model, per post.....		.37	
1 set cables for electrical-firing apparatus, each model, per post.....		15.60	
1 set crane ropes, manila, for barbette carriage, per carriage.....			6.00
1 set screws for name and direction plates, per post.....	.13	a 1.25	.08
2 dozen assorted hexagonal nuts, U. S. S., $\frac{1}{4}$ to 1 $\frac{1}{2}$ inch, per post.....	1.92	1.92	1.92
1 set pawl-hook pins.....	.18		

a Per set.

Notes.—A complete set of these parts as far as applicable to carriages mounted at any post should be kept on hand, except parts of equalizing and pipe throttling device and roller bearings, which will be issued to district armament officers to be kept on hand at arsenals.

In ordering parts of any carriage, always specify the kind, model, and number of carriage to which the part belongs.

MAKING REQUISITION FOR SPARE PARTS.

In making requisitions for spare parts for either gun or carriage the nomenclature given in this manual must be strictly followed. The failure to do so makes it difficult to always determine at the issuing arsenal exactly what parts are to be ordered issued and the failure to do so may cause serious delay in the action on the requisition.

When spare parts or tools for either seacoast or rapid-fire guns or carriages are called for to replace unserviceable parts or tools the unserviceable parts or tools, after repairs or exchanges are made, should be sent to Watervliet and Watertown arsenals, respectively, for gun and carriage parts.

For allowance of paints and material for cleaning and preservation, annually, see Supply Table, pages 359 and 360.

For further details as to care, instructions, etc., see pamphlets issued by Ordnance Department, "Instructions for mounting, etc., 8-inch barbette carriages, model 1892;" "Instructions for mounting, etc., disappearing carriages, L. F., model 1894, for 8-inch breech-loading rifle," and "Instructions for mounting, etc., 8-inch disappearing carriage, L. F., model 1896."

CONTENTS OF ARMAMENT CHEST FOR 8-INCH B. L. RIFLE, MODELS 1888, 1888 Mi, AND 1888 Mii.

(1 armament chest, \$45.75.)

	Price each.		Price each.
1 bar screw-driver for breech-plate screws.....	\$1.60	1 tool for unscrewing housing of crank catch.....	\$2.00
1 bar screw-driver for hinge-pin oil hole, breechblock oil hole, rotating handle and sight, and lock-plate screws.....	.75	1 extension pipe-handle. (Not required for all guns).....	.84
1 bar screw-driver for tray back-latch catch, breech-plate oil hole, spring-lock shoe, tray-latch catch, and tray-lock screws.....	.75	1 obturator-nut wrench.....	5.75
1 bar screw-driver for tray back-latch pivot, bronze bushing (for rifles having steel breech plates), translating stud and vent-cover pivot screws.....	.75	1 obturator-nut washer.....	.20
		1 obturator-nut clamp screw wrench.....	4.44
		1 locking-nut washer.....	2.08
		1 primer key.....	1.50
		1 pin punch.....	.30
		1 tit wrench for obturator spindle.....	1.00
		1 pressure-plug wrench.....	1.90

**CONTENTS OF ARMAMENT CHEST FOR 8-INCH B. L. RIFLE, MODELS 1888, 1888 M1,
AND 1888 M11—Continued.**

	Price each.		Price each.
1 ring for lifting breech plate	\$0.75	2 pounds copper wire, No. 16, per pound..	\$20.20
1 bronze drift (large) .....	.40	1 quire emery cloth, No. 00 ... per quire..	.44
1 bronze drift (small) .....	.25	8 wagon sponges	2.88
1 cleaning reamer for primer seat	1.00	1 file, flat, dead-smooth .....	.13
1 gunner's punch .....	.90	1 file, round, second-cut .....	.07
1 gunner's reamer	1.00	1 file, half-round, smooth .....	.13
1 gunner's gimlet .....	.56	1 file, three-cornered .....	.08
1 gunner's pouch	2.50	1 copper hammer	1.25
1 pair gunner's sleeves	per pair.. 1.18	1 bottermaker's hammer .....	.72
1 gunner's lanyard	1.15	1 hand mallet .....	.16
1 loading tray	12.00	1 long-handled mallet .....	.60
1 metal scraper .....	.43	2 ollers, half pint .....	.13
12 silk wipers, or cotton waste .....	.10	1 pair cutting pliers .....	.60
4 balls twine, assorted	per pound.. .15	1 monkey wrench, 12-inch .....	.52
2 pounds copper wire, No. 12	do.... .20	1 monkey wrench, 15-inch .....	.90

* Ten pounds of cotton waste will be issued in lieu of 12 silk wipers.

CONTENTS OF IMPLEMENT CHEST FOR 8-INCH BARBETTE CARRIAGE, MODEL 1892.

	Price each.		Price each.
1 box wrench for friction-clamp nut		1 double wrench for $\frac{1}{2}$ -inch and $\frac{1}{2}$ -inch nuts	
1 spanner wrench for stuffing-box gland and cylinder head		1 single wrench for 1-inch nuts	
1 screw-driver for journals for recoil roller		1 single wrench for $1\frac{1}{2}$ -inch nuts	
1 screw-driver, commercial		1 single wrench for 1 $\frac{1}{2}$ -inch nuts	
1 screw-driver for dust guard		1 single wrench for 2 $\frac{1}{2}$ -inch nuts	
2 screw eyes for extracting follower in stuffing box		1 oiler, 1 quart	
1 double wrench for chain connection and throttling bars		1 crane block and rope	
1 double wrench for $\frac{1}{2}$ -inch and $\frac{1}{2}$ -inch nuts		The following articles, being too large, are not to be kept in the chest:	
		2 wrenches for piston-rod nuts	
		2 water buckets, indurated fiber	

**CONTENTS OF IMPLEMENT CHEST FOR 8-INCH DISAPPEARING CARRIAGE, L. F., MODEL
1894.**

	Price each.		Price each.
2 hauling-down ropes		1 double wrench for $1\frac{1}{2}$ -inch and $1\frac{1}{2}$ -inch nuts	
2 extractors for stuffing-box washers		1 single wrench for 2-inch nuts	
1 spanner follower wrench for stuffing boxes		1 $\frac{1}{2}$ -inch eyebolt	
1 spanner wrench for front stuffing box		1 wrench for pipe connection	
1 spanner wrench for rear stuffing box		1 crane pulley block and rope	
1 box wrench for cylinder head		1 oiler, 1-quart	
1 double wrench for $\frac{1}{2}$ -inch and $\frac{1}{2}$ -inch nuts		2 counterweight hooks	
1 double wrench for $\frac{1}{2}$ -inch and $\frac{1}{2}$ -inch nuts		The following articles, being too large, are not to be kept in the chest:	
1 double wrench for $\frac{1}{2}$ -inch and 1-inch nuts		2 tripping bars	
1 double wrench for $1\frac{1}{2}$ -inch and $1\frac{1}{2}$ -inch nuts		2 wrenches for piston-rod nuts	
		2 wrenches for suspension-rod nuts ..	
		2 water buckets, indurated fiber	

CONTENTS OF IMPLEMENT CHEST FOR 8-INCH DISAPPEARING CARRIAGE, L. F., MODEL 1896.

	Price each.		Price each.
1 oiler, 1-quart.....		1 extractor for gun-lever and suspension-rod pins.....	
2 wrenches for piston-rod nuts.....		1 screw-driver, steel.....	
1 spanner wrench for stuffing boxes.....		1 screw-driver, commercial.....	
1 wrench for cylinder heads and filling plugs.....		2 counterweight hooks.....	
1 double wrench for $\frac{1}{4}$ -inch and $\frac{1}{2}$ -inch nuts.....		2 cylinder-head extractors.....	
1 double wrench for 1-inch and $\frac{1}{2}$ -inch nuts.....		The following articles, being too large, are not to be kept in the chest:	
1 single wrench for $\frac{1}{4}$ -inch nuts.....		2 pinch bars.....	
1 single wrench for $\frac{1}{2}$ -inch nuts.....		2 water buckets, indurated fiber.....	

CONTENTS OF COMBINATION ARMAMENT CHEST FOR 8-INCH B. L. RIFLE, MODEL 1888, AND 8-INCH DISAPPEARING CARRIAGE, L. F., MODEL 1896.

[For price of tools see page 43, 44.]

For rifle.

	Price each.		Price each.
1 bar-screw-driver for breech-plate screws.....		1 primer key.....	
1 bar-screw-driver for hinge-pin oil hole, breechblock oil hole, rotating handle and sight, and lock-plate screws.....		1 pin punch.....	
1 bar-screw-driver for tray back-latch catch, breech-plate oil hole, spring-bolt shoe, tray latch catch, and tray-lock screws.....		1 tit wrench for obturator spindle.....	
1 bar-screw-driver for securing latch pivot, bronze bushing (for rifles having steel breech plates), translating stud, and vent-cover pivot screws.....		1 pressure-plug wrench.....	
1 loading tray.....		1 tool for unscrewing housing of crank catch.....	
1 obturator-nut wrench.....		1 bronze drift (large).....	
1 obturator-nut washer.....		1 bronze drift (small).....	
1 obturator-nut clamp screw wrench.....		1 gunner's punch, for vent.....	
1 locking-nut washer.....		1 gunner's reamer, for vent.....	
1 metal scraper (for removing paint, etc.).....		1 gunner's gimlet, for vent.....	
1 ring for lifting breech plate.....		1 cleaning reamer for primer seat.....	
1 quire emery cloth, No. 00.....		1 gunner's pouch.....	
3 wagon sponges.....		1 pair gunner's sleeves.....	
2 pounds copper wire, No. 12.....		1 gunner's lanyard.....	
2 pounds copper wire, No. 16.....		1 file, flat, dead-smooth.....	
12 silk wipers or cotton waste ^a		1 file, round, second-cut.....	
4 balls twine, assorted.....		1 file, half-round, smooth.....	
1 extension-pipe handle (used with some guns).....		1 file, three-cornered.....	
		1 copper hammer.....	
		1 boiler-maker's hammer.....	
		1 hand mallet.....	
		1 long-handled mallet.....	
		1 monkey wrench, 12-inch.....	
		1 monkey wrench, 15-inch.....	
		1 pair cutting pliers.....	
		2 oilers, half-pint.....	

^a Ten pounds of cotton waste will be issued in lieu of 12 silk wipers.

For carriage.

	Price each.		Price each.
1 oiler, 1-quart.....		1 extractor for gun-lever and suspension-rod pins.....	
2 wrenches for piston-rod nuts.....		1 screw-driver, steel.....	
1 spanner wrench for stuffing boxes.....		1 screw-driver, commercial.....	
1 wrench for cylinder heads and filling plugs.....		2 counterweight hooks.....	
1 double wrench for $\frac{1}{4}$ -inch and $\frac{1}{2}$ -inch nuts.....		2 cylinder-head extractors.....	
1 double wrench for 1-inch and $\frac{1}{2}$ -inch nuts.....		The following articles, being too large, are not to be kept in the chest:	
1 single wrench for $\frac{1}{4}$ -inch nuts.....		2 pinch bars.....	
1 single wrench for $\frac{1}{2}$ -inch nuts.....		2 water buckets, indurated fiber.....	

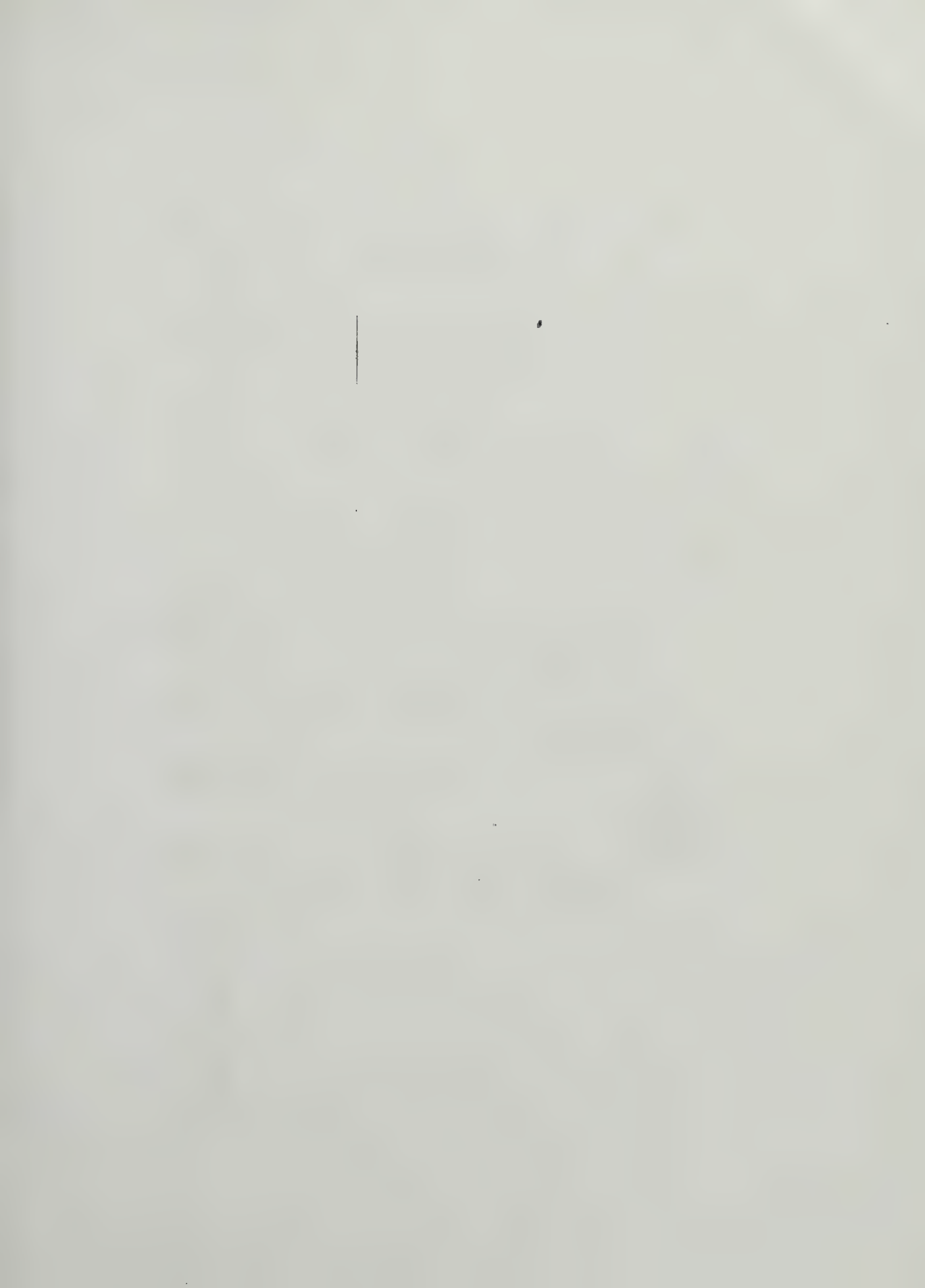


—

•

.

.



CHAPTER II.

DESCRIPTION AND NOMENCLATURE OF PARTS OF 10-INCH B. L. RIFLES AND CARRIAGES.

LIST OF SPARE PARTS FOR ISSUE, ETC.

10-INCH B. L. RIFLE, MODEL 1888.

(Price of rifle, \$23,458.)

INCLUDES GUN PROPER, BREECH MECHANISM, AND SIGHTS, AS PER LIST BELOW.

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock.....	1	Steel.....	In breech.....	Interchangeable	Block.
Breechblock oil-hole screw.	1	...do.....	Top of breechblock...	Not in all blocks; interchangeable.	
Translating stud.....	1	...do.....	Fastened to breechblock.	Interchangeable; should not be removed.	
Translating-stud screw.	1	...do.....	Fastens stud to breechblock.	Interchangeable	
Rotating-bar screws.	2	...do.....	In rear part of breechblock.	Interchangeable; to attach bar for rotation in case breechblock sticks.	
Obturator, complete:					
Obturator spindle, complete—					
Obturator spindle.	1	...do.....	In breechblock.....	Interchangeable	Mushroom spindle; also wrongly called obturator.
Obturator nut.....	1	...do.....	On obturator spindle.	.....do.....	Obturator-spindle nut.
Obturator locking nut.	1	...do.....	On obturator spindle, rear of obturator nut.	.....do.....	Lock nut.
Vent bushing.....	1	Copper.	In obturator-spindle head.	Interchangeable; can not be properly inserted at fort.	
Firing attachment, complete—					
Experimental attachments are under test; as soon as adopted list of parts will be furnished for insertion.					

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Continued.					
Gas-check pad.....	1	Asbestos and tallow in canvas.	On obturator spindle.	Interchangeable	Pad, gas-check.
Front split ring.....	1	Steel....	On obturator spindle, between head and pad.	.....do.....	Front exterior split ring.
Rear split ring.....	1	.....do.....	On obturator spindle, between pad and filling-in disk.	.....do.....	Rear exterior split ring.
Small split ring.....	1	.....do.....	.....do.....	.....do.....	Small interior split ring.
Filling-in disk.....	1	.....do.....	On obturator spindle, between pad and breechblock.	.....do.....	Disk.
Dust cover.....	1	.....do.....	Screwed to obturator-spindle nut.	Not interchangeable	Dust guard.
Dust-cover screws....	3	.....do.....	Screw dust cover to obturator-spindle nut.	Interchangeable	Dust-guard screws.
Obturator-spindle washers.	2	Bronze.	Between obturator nut and breechblock.	Interchangeable, except rear one (steel), which has rear face flat.	Antifriction washers.
	2	Steel....			
Tray, complete:					
Tray.....	1	Bronze.	Fastened to breech...	Interchangeable	Console.
Hinge pin.....	1	Steel....	Holds tray to gun....	Interchangeable; fastened in tray by two hinge-pin securing screws.	
Hinge-pin securing pin, upper.	1	.....do.....	Shorter than lower...	Interchangeable.....	
Hinge-pin securing pin, lower.	1	.....do.....	Longer than upper....	.....do.....	
Hinge-pin oil-hole screw.	1	.....do.....	In hinge pin.....	Interchangeable; not in all guns.	
Translating roller....	1	.....do.....	In tray.....	Interchangeable....	
Translating crank....	1	.....do.....	On translating roller.	.....do.....	
Translating-crank nut.	1	.....do.....	Holds translating crank to translating roller.	.....do.....	
Translating-crank nut pin.	1	.....do.....	Holds translating-crank nut on translating roller.	.....do.....	
Tray latch, complete—					
Tray-latch body....	1	.....do.....	Fastened to tray by tray-latch pivot.	Not interchangeable	
Tray-latch handle, male.	1	.....do.....	In tray latch.....	Interchangeable; issued together.	
Tray-latch handle, female.	1	.....do.....	.....do.....		
Tray-latch handle, pin.	1	.....do.....	Holds two parts of handle together.	Interchangeable.	
Tray-latch pivot.....	1	.....do.....	Holds tray latch to tray.	.....do.....	
Tray-latch pivot washer.	1	.....do.....	On tray-latch pivot	.....do.....	
Tray-latch pivot pin.	1	.....do.....	In tray-latch pivot	.....do.....	
Tray-spring bolt.....	1	.....do.....	In tray.....	Interchangeable; used in some guns of this model.	
Tray-spring bolt spring.	1	.....do.....	On tray-spring bolt	.....do.....	
Tray-spring bolt.....	1	.....do.....	In tray.....	Interchangeable; used in all other guns of this model instead of as above.	
Tray-spring bolt spring.	1	.....do.....	On tray-spring bolt	.....do.....	
Tray-spring bolt shoe	1	.....do.....	.....do.....	.....do.....	
Tray-spring bolt shoe screw.	1	.....do.....	.....do.....	.....do.....	
Traylock, complete—					
Tray-lock bolt.....	1	.....do.....	In tray in rear of tray-latch pivot.	Interchangeable; used in some guns of this model; is to be attached to others.	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray—Continued. Tray lock—Cont'd. Tray-lock lever....	1	Steel ...	Fastened to tray by tray-lock lever pivot.	Interchangeable; used in some guns of this model; is to be attached to others.	Tray-lock cam.
Tray-lock link.....	1	...do ...	Connects lever with tray latch.	...do	
Tray-lock link pin.	1	...do ...	Connects lever and link.	...do	
Tray-lock lever pivot.	1	...do ...	Holds lever to tray.	...do	
Tray-lock pin.....	1	...do ...	Connects tray latch to link.	...do	
Tray-lock pin-nut.	1	...do ...	On tray-lock pin.	...do	
Tray-lock pin-nut pin.	1	...do ...	Through tray-lock pin and nut.	...do	
Tray back-latch catch.	1	...do ...	Fastened to tray.	Interchangeable	Securing latch catch.
Tray back-latch catch screws.	2	...do ...	Fasten tray back-latch catch to tray.	...do	Securing latch-catch screws.
Rotating crank: Rotating-crank body	1	Steel....	Fastened to rotating pinion.	This old form of rotating crank used in some guns.	
Rotating-crank sleeve.	1	Wrought iron.	On spindle of rotating crank.	...do	
Rotating-crank sleeve screw.	1	Steel....	Screws sleeve to spindle.	...do	
Rotating-crank body	1	...do ...	Attached to rotating pinion.	This form of rotating crank is the latest and used on some guns of this model; is to be attached to others; interchangeable.	
Rotating-crank sleeve.	1	Bronze.	On crank spindle.	...do	
Rotating-crank sleeve washer.	1	Steel....	In end of crank sleeve.	...do	
Rotating-crank sleeve washer screw.	1	...do ...	Holds sleeve and washer on crank spindle.	...do	
Rotating-crank sleeve screw.	1	...do ...	Holds washer to sleeve.	...do	
Rotating-crank nut ...	1	...do ...	Holds rotating crank to rotating pinion.	Interchangeable	
Rotating-crank nut pin.	1	...do ...	Holds rotating-crank nut to rotating pinion.	...do	
Rotating-pinion	1	...do ...	In breech plate.	...do	
Rotating-pinion bushing.	1	Bronze	...do .....	...do	
Rotating-pinion bushing screw.	1	Steel....	...do .....	...do	
Rotating-pinion washer.	1	...do ...	On rotating pinion	...do	
Intermediate pinion...	1	...do ...	Meches with rotating pinion and larger wheel of compound gear.	...do	
Intermediate-pinion pivot.	1	...do ...	Through intermediate pinion.	...do	
Compound gear	1	...do ...	Meches with intermediate pinion and rotating ring.	...do	
Compound-gear pivot.	1	...do ...	Through compound gear.	...do	
Compound-gear pivot nut.	1	Bronze.	On compound gear pivot.	...do	
Compound-gear pivot-nut pin.	1	Steel....	Through compound gear-pivot nut.	...do	
Compound-gear bushing.	1	Bronze.	Between compound gear and its pivot.	...do	
Rotating-crank lock bolt.	1	Steel....	In rotating crank	...do	
Rotating-crank lock spring.	1	...do ...	...do .....	...do	
Rotating-crank lock housing.	1	Bronze	...do .....	...do	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Rotating-crank lock washer.	1	Steel....	In rotating crank	Interchangeable	
Rotating-crank lock handle.	1	...do	On crane-lock bolt....	...do	
Rotating-crank lock-handle pin.	1	...do	In handle .....	...do	
Rotating-crank lock plate, upper.	1	...do	In breech plate.....	Used in some guns; some screwed in and held from turning by 1 spline screw; some held in by screws. Requisition should state which style is required.	
Rotating-crank lock plate, lower.	1	...do ....	...do .....	...do	
Rotating-crank lock-plate spline screws.	Varies	...do	In crank-lock plate ..	Interchangeable	
Rotating-crank lock-plate screws.	Varies	...do ....	...do .....	...do	
Vent cover	1	...do	In breechblock .....	...do	
Vent-cover pivot.....	1	...do ....	...do .....	...do	
Tray back-latch body..	1	...do	Fastened to breech ..	...do	Securing latch body.
Tray back-latch handle.	1	...do	Screwed into tray back-latch body.	...do	Securing latch handle.
Tray back-latch pin...	1	...do	Screwed into tray back-latch handle and body.	...do	Securing latch-handle pin.
Tray back-latch pivot.	1	...do	Holds tray back latch to gun.	...do	Securing latch pivot.

Parts attached to gun proper, but removable.

Breech plate	1	Bronze or steel.	Screwed to breech....	Removable only at factory.	
Breech-plate screws...	15	Steel ...	Screw breech plate to breech.	Interchangeable; the number varies in different guns.	
Tray-latch catch	1	...do	Screwed to breech plate.	Used with guns having bronze breech plate.	
Tray-latch catch screws.	2	...do	Screwed into breech plate.	...do	
Rotating ring.....	1	...do	Between breech plate and breech. Encircles breechblock.	Removable only at factory.	Gear ring.
Breech-plate bushing..	1	Bronze ..	Screwed to front face of breech plate.	Used only on guns having steel breech plate.	
Breech-plate bushing screws.	6	Steel ...	Hold breech-plate bushing to breech plate.	Interchangeable ...	
Breech-plate oil-hole screws.	4	...do	Top of breech plate...	...do	

Issued with gun as parts thereof.

Front axial sight.....	1	Steel ...	Screwed into gun at trunnion hoop.	Interchangeable ...	
Rear axial sight.....	1	...do	Screwed to breech of gun.	...do	
Rear axial-sight screws	2	...do	Hold rear axial sight to gun.	...do	
Rear tangent-sight socket guard.	1	Brass ...	Attach rear tangent-sight seat in ship-ping.	...do	
Rear tangent-sight socket-guard screws.	3	Steel ...	In guard .....	...do	

10-INCH B. L. RIFLE, MODEL 1888.

Weight, 30 gross tons (67,200 pounds).
 Distance between rimbases, 42 inches.
 Length of trunnions, 6.75 inches.
 Distance of axis of trunnions from muzzle, 243.65 inches.
 Total length, 367.25 inches.
 Length of bore, 340.2 inches.
 Maximum diameter of breech, 38.5 inches.
 Diameter of muzzle, 16.8 inches.
 Diameter of trunnions, 12 inches.
 Powder chamber:
 Diameter, 11.8 inches.
 Length, 65.09 inches.
 Capacity, 7,064 cubic inches.
 Travel of projectile in bore, 27.511 calibers, 275.11 inches.
 Projectile:

Kind.	Armor-piercing shot.	Armor-piercing shell.	Cast-iron shot.
Weight (filled).....pounds..	575	575	575
Ratio of weight to weight of piece	1-118	1-118	1-118
Weight of bursting charge, gun cotton ..pounds..	22.40	22.40	22.40
Length .....calibers..	3.50	4.00	3.50
Sectional density $\frac{W}{L^3}$	7.33	7.33	7.33
Price each (without fuse and bursting charge)....	\$90.00	\$67.00	\$22.25

Powder:

Kind, brown prismatic and smokeless, 10-inch breech-loading rifle.
 Weight, 280 pounds brown; 140 pounds smokeless.
 Density of loading, 1.0886 brown; 0.1441 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.
 Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.
 Smokeless, 37,000 pounds.

Muzzle energy:

Brown, 16,345 foot-tons.
 Smokeless, 21,086 foot-tons.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 21.1 inches.
 Smokeless, 25.3 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 19.2 inches.
 Smokeless, 23 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 16.6 inches.
 Smokeless, 20 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 15.1 inches.
 Smokeless, 18.1 inches.

Rifling:

Number of grooves, 60.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.08 inch.

Width of lands, 0.15 inch.

Twist of rifling one turn in 50 calibers at origin; increasing to one turn in 25 calibers at 20 inches from muzzle, being uniform over the 20 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

10-INCH B. L. RIFLE, MODEL 1888 M.

(Price of rifle, \$23,456.)

INCLUDES GUN PROPER, BREECH MECHANISM, AND SIGHTS, AS PER LIST BELOW.

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock	1	Steel....	In breech.....	Interchangeable	Block.
Breechblock oil-hole screw.	1	...do	Top of breechblock ..	Not in all blocks; interchangeable.	
Translating stud	1	...do	Fastened to breech-block.	Interchangeable; should not be removed.	
Translating-stud screw.	1	...do	Fastens stud to breechblock.	Interchangeable	
Rotating-bar screws.	2	...do	In rear part of breechblock.	Interchangeable; to attach bar for rotation in case breechblock sticks.	
Obturator, complete:					
Obturator spindle, complete—					
Obturator spindle..	1	...do	In breechblock.....	Interchangeable	Mushroom spindle; also wrongly called obturator.
Obturator nut	1	...do	On obturator spindle.	.....do	Obturator-spindle nut.
Obturator locking nut.	1	...do	On obturator spindle, rear of obturator nut.	.....do	Lock nut.
Vent bushing	1	Copper .	In obturator-spindle head.	Interchangeable; can not be properly inserted at fort.	
Firing attachment, complete—					
Experimental attachment—					
Experimental attachment— ments are under test; as soon as adopted list of parts will be furnished for insertion.					
Gas-check pad.....	1	Asbestos and tal-low in canvas.	On obturator spindle.	Interchangeable	Pad, gas-check.
Front split ring	1	Steel....	On obturator spindle, between head and pad.	.....do	Front exterior split ring.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Cont'd.					
Rear split ring	1	Steel	On obturator spindle, between pad and filling-in disk.	Interchangeable	Rear exterior split ring.
Small split ring	1	...do....	.....do.....	.....do.....	Small interior split ring.
Filling-in disk	1	...do....	On obturator spindle, between pad and breechblock.	.....do.....	Disk.
Dust cover	1	...do....	Screwed to obturator spindle nut.	Not interchangeable.	Dust guard.
Dust-cover screws	3	...do....	Screw dust cover to obturator spindle nut.	Interchangeable	Dust-guard screws.
Obturator spindle washers.	2	Bronze	Between obturator nut and breechblock.	Interchangeable, except rear one, steel, which has rear face flat.	Antifriction washers.
	2	Steel			
Tray, complete:					
Tray	1	Bronze	Fastened to breech...	Interchangeable	Console.
Hinge pin	1	Steel	Holds tray to gun	Interchangeable; fastened in tray by 2 hinge-pin securing screws.	
Hinge-pin securing pin, upper.	1	...do....	Shorter than lower...	Interchangeable	
Hinge-pin securing pin, lower.	1	...do....	Longer than upper .....	.....do.....	
Hinge-pin oil-hole screw.	1	...do....	In hinge pin	Interchangeable; not in all guns.	
Translating roller	1	...do....	In tray	Interchangeable	
Translating crank	1	...do....	On translating roller.	.....do.....	
Translating-crank nut.	1	...do....	Holds translating crank to translating roller.	.....do.....	
Translating-crank nut pin.	1	...do....	Holds translating-crank nut on translating roller.	.....do.....	
Tray latch, complete—					
Tray-latch body...	1	...do....	Fastened to tray by tray-latch pivot.	Not interchangeable.	
Tray-latch handle, male.	1	...do....	In tray latch	Interchangeable; issued together.	
Tray-latch handle, female.	1	...do....	.....do.....		
Tray-latch handle pin.	1	...do....	Holds 2 parts of handle together.	Interchangeable	
Tray-latch pivot	1	...do....	Holds tray latch to tray.	.....do.....	
Tray-latch pivot-washer.	1	...do....	On tray-latch pivot .....	.....do.....	
Tray-latch pivot-pin.	1	...do....	In tray-latch pivot .....	.....do.....	
Tray-spring bolt	1	...do....	In tray	Interchangeable; used in some guns of this model.	
Tray-spring bolt spring.	1	...do....	On tray-spring bolt .....	.....do.....	
Tray-spring bolt	1	...do....	In tray	Interchangeable; used in all other guns of this model instead of as above.	
Tray-spring bolt spring.	1	...do....	On tray-spring bolt .....	.....do.....	
Tray-spring bolt shoe	1	...do....	.....do.....	.....do.....	
Tray-spring bolt shoe screw.	1	...do....	.....do.....	.....do.....	
Tray lock, complete—					
Tray-lock bolt	1	...do....	In tray in rear of tray-latch pivot.	Interchangeable; used in some guns of this model; is to be attached to others.	
Tray-lock lever	1	...do....	Fastened to tray by tray-lock lever pivot.	.....do.....	Tray-lock cam.
Tray-lock link	1	...do....	Connects lever with tray latch.	.....do.....	
Tray-lock link pin.	1	...do....	Connects lever and link.	.....do.....	
Tray-lock lever pivot.	1	...do....	Holds lever to tray .....	.....do.....	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray—Continued.					
Tray lock—Cont'd.					
Tray-lock pin.....	1	Steel....	Connects tray latch to link.	Interchangeable; used in some guns of this model; is to be attached to others.	
Tray-lock pin nut.	1	...do....	On tray-lock pin .....	...do.....	
Tray-lock pin-nut pin.	1	...do....	Through tray-lock pin and nut.	...do.....	
Tray back-latch catch.	1	...do....	Fastened to tray.....	Interchangeable	Securing latch catch.
Tray back-latch catch screws.	2	...do....	Fasten tray back-latch catch to tray.	...do.....	Securing latch-catch screws.
Rotating crank:					
Rotating-crank body	1	...do....	Attached to rotating pinion.	This form of rotating crank is the latest and used on some guns of this model; is to be attached to others; interchangeable.	
Rotating-crank sleeve.	1	Bronze.	On crank spindle.....	...do.....	
Rotating-crank sleeve washer.	1	Steel....	In end of crank sleeve.	...do.....	
Rotating-crank sleeve-washer screw.	1	...do....	Holds sleeve and washer on crank washer.	...do.....	
Rotating-crank sleeve screw.	1	...do....	Holds washer to sleeve.	...do.....	
Rotating-crank nut ...	1	...do....	Holds rotating crank to rotating pinion.	Interchangeable	
Rotating-crank nut pin	1	...do....	Holds rotating crank nut to rotating pinion.	...do.....	
Rotating pinion	1	...do....	In breech plate.....	...do.....	
Rotating-pinion bushing.	1	Bronze.	...do.....	...do.....	
Rotating-pinion bushing screw.	1	Steel .....	...do.....	...do.....	
Rotating-pinion washer.	1	...do....	On rotating pinion ...	...do.....	
Intermediate pinion ..	1	...do....	Meshes with rotating pinion and larger wheel of compound gear.	...do.....	
Intermediate-pinion pivot.	1	...do....	Through intermediate pinion.	...do.....	
Compound gear	1	...do....	Meshes with intermediate pinion and rotating ring.	...do.....	
Compound-gear pivot.	1	...do....	Through compound gear.	...do.....	
Compound-gear pivot nut.	1	Bronze.	On compound-gear pivot.	...do.....	
Compound-gear pivot-nut pin.	1	Steel....	Through compound-gear pivot nut.	...do.....	
Compound-gear bushing.	1	Bronze.	Between compound gear and its pivot.	...do.....	
Rotating-crank lock bolt.	1	Steel....	In rotating crank ...	...do.....	
Rotating-crank lock spring.	1	...do....	...do.....	...do.....	
Rotating-crank lock housing.	1	Bronze.	...do.....	...do.....	
Rotating-crank lock washer.	1	Steel....	...do.....	...do.....	
Rotating-crank lock handle.	1	...do....	On crank-lock bolt ...	...do.....	
Rotating-crank lock handle pin.	1	...do....	In handle .....	...do.....	
Rotating-crank plate, upper.	1	...do....	In breech plate.....	Used in some guns; some screwed in and held from turning by 1/2 spline screw; some held in by screws. Requirement should state which style is required.	
Rotating-crank lock plate, lower.	1	...do....	...do.....	...do.....	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Rotating-crank lock-plate spline screws.	Varies	Steel....	In crank-lock plate ..	Interchangeable	
Rotating-crank lock-plate screws.	Varies	do	do	do	
Vent cover	1	do	In breechblock	do	
Vent-cover pivot	1	do	do	do	
Tray back latch (securing latch):					
Tray back-latch body	1	do	Fastened to breech	do	Securing latch body.
Tray back-latch handle.	1	do	Screwed into tray back-latch body.	do	Securing latch handle.
Tray back-latch pin.	1	do	Screwed into tray back-latch handle and body.	do	Securing latch-handle pin.
Tray back-latch pivot.	1	do	Holds tray back latch to gun.	do	Securing latch pivot.

Parts attached to gun proper, but removable.

Breech plate	1	Bronze or steel.	Screwed to breech ..	Removable only at factory.	Gear ring.
Breech-plate screws...	15	Steel....	Screw breech plate to breech.	Interchangeable; the number varies in different guns.	
Tray latch catch	1	do	Screwed to breech plate.	Used with guns having bronze breech plate.	
Tray latch-catch screws.	2	do	Screwed into breech plate.	do	
Rotating ring	1	do	Between breech plate and breech; encircles breechblock.	Removable only at factory.	
Breech-plate bushing.	1	Bronze	Screwed to front face of breech plate.	Used only on guns having steel breech plate.	
Breech-plate bushing screws.	6	Steel....	Hold breech-plate bushing to breech plate.	Interchangeable	
Breech-plate oil-hole screws.	4	do	Top of breech plate ..	do	

Issued with gun as parts thereof.

Front axial sight	1	Steel....	Screwed into gun at trunnion hoop.	Interchangeable	
Rear axial sight	1	do	Screwed to breech of gun.	do	
Rear axial-sight screws	2	do	Hold rear axial sight to gun.	do	
Rear tangent-sight socket guard.	1	Brass ...	Attach rear tangent-sight seat in shipping.	do	
Rear tangent-sight socket-guard screws.	3	Steel....	In guard	do	

10-INCH B. L. RIFLE, MODEL 1888 M1.

Weight, 30 gross tons (67,200 pounds).

Distance between rimbases, 42 inches.

Length of trunnions, 6.75 inches.

Distance of axis of trunnions from muzzle, 243.05 inches.

Total length, 367.25 inches.

Length of bore, 340.2 inches.

Maximum diameter of breech, 38.5 inches.

Diameter of muzzle, 16.8 inches.

Diameter of trunnions, 12 inches.

Powder chamber:

Diameter, 11.8 inches.

Length, 65.09 inches.

Capacity, 7,064 cubic inches.

Travel of projectile in bore, 27,511 caliber, 275.11 inches.

Projectile:

Kind.	Armor- piercing shot.	Armor- piercing shell.	Cast-iron shot.
Weight filled.....pounds..	575	575	575
Ratio of weight to weight of piece.....	1-118	1-118	1-118
Weight of bursting charge, gun cotton...pounds..	22.40	22.40	22.40
Length.....calibers..	3.50	4.00	3.50
Sectional density $\frac{W}{L^2}$	7.83	7.83	7.83
Price each (without fuse or bursting charge).....	\$90.00	\$67.00	\$22.25

Powder:

Kind, brown prismatic and smokeless, 10-inch breech-loading rifle.

Weight, 280 pounds brown; 140 pounds smokeless.

Density of loading, 1.0686 brown; 0.5441 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.

Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.

Smokeless, 37,000 pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 21.1 inches.

Smokeless, 25.3 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 19.2 inches.

Smokeless, 23 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 16.6 inches.

Smokeless, 20 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 15.1 inches.

Smokeless, 18.1 inches.

Muzzle energy:

Brown, 16,345 foot-tons.

Smokeless, 21,086 foot-tons.

Rifling:

Number of grooves, 60.

Width of grooves, 0.8736 inch.

Depth of grooves, 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 20 inches from muzzle, being uniform over the 20 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

10-INCCH R. L. RIFLE, MODEL 1888 M.D.

Price of rifle, \$28.00.

EXCLUDES GUN PROPER, BREACH MECHANISM, AND SIGHTS, AS PER LIST BELOW.

Breach mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Examine and inspect in service, etc.
Breechblock, complete:					
Breechblock.	1	Steel.	In breech.	Interchangeable.	Block.
Breechblock out-hole screw.	1	do.	Top of breechblock.	Not in all blocks, interchangeable.	
Translating stud.	1	do.	Fastened to breechblock.	Interchangeable, should not be removed.	
Translating-stud screw.	1	do.	Fastens stud to breechblock.	Interchangeable.	
Rotating-bar screws.	2	do.	In rear part of breechblock.	Interchangeable; to attach bar for rotation increase breechblock sticks.	
Obturator, complete:					
Obturator spindle, complete.					
Obturator spindle.	1	do.	In breechblock.	Interchangeable.	Mushroom spindle; also wrongly called obturator.
Obturator nut.	1	do.	On obturator spindle.	do.	Obturator-spindle nut.
Obturator locking nut.	1	do.	On obturator spindle, rear of obturator nut.	do.	Lock nut.
Vent bushing.	1	Copper.	In obturator-spindle head.	Interchangeable; can not be properly inserted at first.	
Firing attachment, complete—					
Experimental attachment are under test; as soon as adopted, list of parts will be furnished for insertion.					
Gas-check pad.	1	Asbestos and tallow in canvas.	On obturator spindle.	Interchangeable.	Pad, gas-check.
Front split ring.	1	Steel.	On obturator spindle between head and pad.	do.	Front exterior split ring.
Rear split ring.	1	do.	On obturator spindle between pad and filling-in disk.	do.	Rear exterior split ring.
Small split ring.	1	do.	do.	do.	Small interior split ring.
Filling-in disk.	1	do.	On obturator spindle between pad and breechblock.	do.	Disk.
Dust cover.	1	do.	Screwed to obturator-spindle nut.	Not interchangeable.	Dust guard.
Dust-cover screws.	3	do.	Screw dust cover to obturator-spindle nut.	Interchangeable.	Dust-guard screws.
Obturator spindle washers.	2 2	Bronze Steel.	Between obturator nut and breechblock.	Interchangeable; except rear one, steel, which has rear face flat.	Anti-friction washers.

Breach mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray, complete:					
Tray.....	1	Bronze	Fastened to breech...	Interchangeable....	Console.
Hinge pin.....	1	Steel....	Holds tray to gun....	Interchangeable; fastened in tray by 2 hinge-pin secur- ing screws.	
Hinge-pin securing pin, upper.	1	...do....	Shorter than lower...	Interchangeable....	
Hinge-pin securing pin, lower.	1	...do....	Longer than upper....	...do.....	
Hinge-pin oil-hole screw.	1	...do....	In hinge pin.....	Interchangeable; not in all guns.	
Translating roller...	1	...do....	In tray.....	Interchangeable....	
Translating crank...	1	...do....	On translating roller	...do.....	
Translating-crank nut.	1	...do....	Holds translating crank to translating roller.	...do.....	
Translating-crank nut pin.	1	...do....	Holds translating- crank nut on trans- lating roller.	...do.....	
Tray-latch body....	1	...do....	Fastened to tray by tray-latch pivot.	Not interchangeable	
Tray latch, com- plete—					
Tray-latch handle, male.	1	...do....	In tray latch.....	Interchangeable; is- sued together.	
Tray-latch handle, female.	1	...do....	...do.....		
Tray-latch handle pin.	1	...do....	Holds 2 parts of han- dle together.	Interchangeable....	
Tray-latch pivot....	1	...do....	Holds tray latch to tray	...do.....	
Tray-latch pivot washer.	1	...do....	On tray-latch pivot	...do.....	
Tray-latch pivot pin.	1	...do....	In tray-latch pivot	...do.....	
Tray-spring bolt....	1	...do....	In tray.....	Interchangeable; used in some guns of this model.	
Tray-spring bolt spring.	1	...do....	On tray-spring bolt...	...do.....	
Tray-spring bolt....	1	...do....	In tray.....	Interchangeable; used in all other guns of this model instead of as above.	
Tray-spring bolt spring.	1	...do....	On tray-spring bolt...	...do.....	
Tray-spring bolt shoe	1	...do....	...do.....	...do.....	Tray-lock cam.
Tray-spring bolt- shoe screw.	1	...do....	...do.....	...do.....	
Tray-lock, com- plete—					
Tray-lock bolt....	1	...do....	In tray, in rear of tray-latch pivot.	Interchangeable; used in some guns of this model; is to be attached to others.	
Tray-lock lever....	1	...do....	Fastened to tray by tray-lock lever pivot.	...do.....	
Tray-lock link....	1	...do....	Connects lever with tray latch.	...do.....	
Tray-lock link pin.	1	...do....	Connects lever and link.	...do.....	
Tray-lock lever pivot.	1	...do....	Holds lever to tray	...do.....	
Tray-lock pin....	1	...do....	Connects tray-latch to link.	...do.....	
Tray-lock pin nut.	1	...do....	On tray-lock pin....	...do.....	
Tray-lock pin nut pin.	1	...do....	Through tray-lock pin and nut.	...do.....	Securing-latch catch. Securing-latch catch screws.
Tray back-latch catch.	1	...do....	Fastened to tray....	Interchangeable....	
Tray back-latch catch screws.	2	...do....	Fasten tray back- latch catch to tray.	...do.....	
Rotating crank:					
Rotating-crank body	1	...do....	Attached to rotating pinion.	This form of rotating crank is the latest and used on some guns of this model; is to be attached to others; inter- changeable.	
Rotating-crank sleeve.	1	Bronze	On crank spindle....	...do.....	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Rotating crank—Con. Rotating-crank sleeve washer.	1	Steel....	In end of crank sleeve.	This form of rotating crank is the latest and used on some guns of this model; is to be attached to others; interchangeable.	
Rotating-crank sleeve washer screw.	1	do	Holds sleeve and washer on crank spindle.	do	
Rotating-crank sleeve screw.	1	do	Holds washer to sleeve	do	
Rotating-crank nut ..	1	do	Holds rotating crank to rotating pinion.	Interchangeable ..	
Rotating-crank nut pin	1	do	Holds rotating crank nut to rotating pinion.	do	
Rotating pinion	1	do	In breech plate	do	
Rotating-pinion bushing.	1	Bronze ..	do	do	
Rotating-pinion bushing screw.	1	Steel....	do	do	
Rotating-pinion washer.	1	do	On rotating pinion ..	do	
Intermediate pinion ..	1	do	Meshes with rotating pinion and larger wheel of compound gear.	do	
Intermediate-pinion pivot.	1	do	Through intermediate pinion.	do	
Compound gear	1	do	Meshes with intermediate pinion and rotating ring.	do	
Compound-gear pivot ..	1	do	Through compound gear.	do	
Compound-gear pivot nut.	1	Bronze ..	On compound-gear pivot.	do	
Compound-gear pivot nut pin.	1	Steel ..	Through compound-gear pivot nut.	do	
Compound-gear bushing.	1	Bronze ..	Between compound gear and its pivot.	do	
Rotating-crank lock bolt.	1	Steel ..	In rotating crank ..	do	
Rotating-crank lock spring.	1	do	do	do	
Rotating-crank housing.	1	Bronze ..	do	do	
Rotating-crank washer.	1	Steel ..	do	do	
Rotating-crank handle.	1	do	On crank-lock bolt ..	do	
Rotating-crank handle pin.	1	do	In handle	do	
Rotating-crank plate, upper.	1	do	In breech plate	Used in some guns; some screwed in and held from turning by spline screw; some held in by screws. Regulation should state which style is required.	
Rotating-crank lock plate, lower.	1	do	do	do	
Rotating-crank lock-plate spline screws.	Va- ries.	do	In crank-lock plate ..	Interchangeable ..	
Rotating-crank lock-plate screws.	Va- ries.	do	do	do	
Vent cover	1	do	In breechblock	do	
Vent-cover pivot	1	do	do	do	
Tray back latch (securing latch)— Tray back-latch body	1	do	Fastened to breech ..	do	Securing latch body.
Tray back-latch handle.	1	do	Screwed into tray back-latch body.	do	Securing latch handle.
Tray back-latch pin ..	1	do	Screwed into tray back-latch handle and body.	do	Securing latch-handle pin.
Tray back-latch pivot ..	1	do	Holds tray back-latch to gun.	do	Securing latch pivot.

Parts attached to gun proper, but removable.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breech plate	1	Bronze or steel.	Screwed to breech ...	Removable only at factory.	Gear ring.
Breech-plate screws...	15	Steel....	Screw breech plate to breech.	Interchangeable; the number varies in different guns.	
Tray-latch catch	1	...do....	Screwed to breech plate.	Used with guns having bronze breech plate.	
Tray-latch catch screws.	2	...do....	Screwed into breech plate.	.....do.....
Rotating ring	1	...do....	Between breech plate and breech; encircles breechblock.	Removable only at factory.	
Breech-plate bushing..	1	Bronze.	Screwed to front face of breech plate.	Used only on guns having steel breech plate.	
Breech-plate bushing screws.	6	Steel....	Hold breech-plate bushing to breech plate.	Interchangeable ...	
Breech-plate oil-hole screws.	4	...do....	Top of breech plate ..	.....do.....

Issued with gun as parts thereof.

Front axial sight.....	1	Steel....	Screwed into gun at trunnion.	Interchangeable	
Rear axial sight.....	1	...do....	Screwed to breech of gun.	.....do.....
Rear axial-sight screws	2	...do....	Hold rear axial sight to gun.	.....do.....
Rear tangent-sight socket guard.	1	Brass...	Attach rear tangent-sight seat in ship-ping.	.....do.....
Rear tangent-sight socket-guard screws.	3	Steel....	In guard .....	.....do.....

10-INCH B. L. RIFLE, MODEL 1888 MII.

Weight, 30 gross tons (67,200 pounds).

Distance between rimbases, 42 inches.

Length of trunnions, 6.75 inches.

Distance of axis of trunnions from muzzle, 243.05 inches.

Total length, 367.25 inches.

Length of bore, 340.8 inches.

Maximum diameter of breech, 38.5 inches.

Diameter of muzzle, 16.8 inches.

Diameter of trunnions, 12 inches.

Powder chamber:

Diameter, 11.8 inches.

Length, 65.49 inches.

Capacity, 7,123 cubic inches.

Travel of projectile in bore, 27.511 calibers, 275.11 inches.

Projectile:

Kind.	Armor-piercing shot.	Armor-piercing shell.	Cast-iron shot.
Weight (filled).....pounds..	575	575	575
Ratio of weight to weight of piece.....	1-118	1-118	1-118
Weight of bursting charge, gun cotton.....pounds..	22.40	22.40	22.40
Length.....calibers..	3.50	4.00	3.50
Sectional density $\frac{W}{\pi r^2}$	7.33	7.33	7.33
Price each without fuse or bursting charge.....	\$90.00	\$67.00	\$22.25

Powder:

Kind, brown prismatic and smokeless, 10-inch breech-loading rifle.

Weight, 280 pounds brown; 140 pounds smokeless.

Density of loading, 1.0886 brown; 0.5441 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.

Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.

Smokeless, 37,000 pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 21.1 inches.

Smokeless, 25.3 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 19.2 inches.

Smokeless, 23 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 16.6 inches.

Smokeless, 20 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 15.1 inches.

Smokeless, 18.1 inches.

Muzzle energy:

Brown, 16,345 foot-tons.

Smokeless, 21,066 foot-tons.

Rifling:

Number of grooves, 60.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 20 inches from muzzle, being uniform over the 20 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

10-INCH B. L. RIFLE, MODEL 1895.

(Price of rifle, \$23,150.)

INCLUDES GUN PROPER, BREECH MECHANISM, AND PARTS ATTACHED TO GUN BUT REMOVABLE (SEE LIST BELOW).

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock.....	1	Steel.....	In breech.....	Interchangeable.....	Block.
Breechblock oil-hole screw.....	1	do.....	In breechblock.....	do.....	
Vent cover.....	1	do.....	do.....	do.....	
Vent-cover pivot.....	1	do.....	Holds vent cover to breechblock.	do.....	
Obturator, complete:					
(Obturator spindle, complete—					
Obturator spindle..	1	do.....	In breechblock.....	do.....	Spindle, mushroom; also wrongly called obturator.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Continued.					
Obturator spindle, complete—Con.					
Vent bushing.....	1	Copper..	Pressed into obturator-spindle head.	Interchangeable	
Pressure-plug screws.	2	Steel....	In obturator-spindle head.	.....do	
Pressure-plug washers.	2	...do....	On pressure-plug screws.	.....do	
Obturator nut.....	1	...do....	On rear end of obturator spindle.	.....do	Obturator-spindle nut.
Obturator locking nut.	1	...do....	.....do .....	.....do	Lock nut.
Firing attachment, complete—					
Experimental attachment— ments are under test; as soon as adopted, list of parts will be furnished for insertion.					
Front split ring....	1	Steel....	Against rear face of obturator-spindle head.	Interchangeable	Front exterior split ring.
Rear split ring	1	...do....	In rear of gas-check pad.	.....do	Rear exterior split ring.
Small split ring ...	1	...do....	.....do .....	.....do	Spindle split ring, interior split ring.
Filling-in disk.....	1	...do....	Between front face of breechblock and gas-check pad, etc.	.....do	Disk.
Gas-check pad.....	1	Asbestos and tallow in canvas.	Between obturator-spindle head, split rings, etc.	.....do	Gas-check pad.
Obturator washer— Obturator-washer cup, front.	1	Steel....	Between obturator-spindle nut and shoulder in breechblock.	.....do	
Obturator-washer cup, rear.	1	...do....	.....do .....	.....do	
Obturator-washer connector.	1	...do....	Holds cups together.	Not interchangeable.	
Obturator-washer balls.	20	...do....	Between cups	Interchangeable	
Obturator-washer screws.	4	...do....	Holds cups and washer together.	.....do	
Tray, complete:					
Tray	1	...do....	Fastened to breech...	.....do	Console.
Hinge pin	1	...do....	Enters two lugs in hinge.	.....do	
Hinge-pin nut.....	1	...do....	On hinge pin.....	.....do	
Hinge-pin nut pin...	1	...do....	In hinge-pin nut .....	.....do	
Hinge-pin oil-hole screw.	1	...do....	.....do .....	.....do	
Hinge-pin securing screw.	1	...do....	In hinge and hinge pin.	.....do	
Tray ball bearing— Cups for tray ball bearing.	2	...do....	.....do .....	.....do	
Connector for tray ball bearing.	1	Copper..	Connects cups.....	Interchangeable, but can not be inserted at fort.	
Balls for tray ball bearing.	27	Steel....	Between upper and lower cups.	Interchangeable	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray—Continued.					
Tray latch.....	1	Steel....	Pivoted to tray.....	Interchangeable....	
Tray-latch pivot.....	1	...do....	Holds tray latch to tray.	...do....	
Tray-latch spring.....	1	...do....	In tray latch.....	...do....	
Tray-latch lock bolt.....	1	...do....	In tray.....	...do....	
Tray-latch lock-bolt spring.....	1	...do....	On tray-latch catch bolt.	...do....	
Tray-latch operating stud.....	1	...do....	Between tray latch and tray.	...do....	
Worm wheel.....	1	Bronze..	Lower end of hinge pin.	Not interchangeable; worm wheel, with its worm shaft, fits any gun of this model.	
Worm shaft.....	1	Steel....	In lower part hinge..	...do....	Worm.
Worm-shaft bushing.....	1	Bronze..	Inner end worm shaft.	Interchangeable....	
Worm-shaft housing.....	1	...do....	Screws into hinge; holds worm shaft.	...do....	
Thrust bearing for worm shaft (2)—					
Thrust-bearing cups.....	2	Steel....	On worm shaft; one at inner end, one against housing.	Thrust bearing, as a whole, interchangeable.	
Connectors for thrust bearing.....	2	Bronze..	...do....	...do....	
Balls for thrust bearing.....	28	Steel....	...do....	...do....	
Operating crank—					
Operating-crank body.....	1	...do....	On square end worm shaft.	Interchangeable....	
Operating-crank set screw.....	1	...do....	Secures operating-crank body to worm shaft.	...do....	
Operating-crank spindle.....	1	...do....	On outer end operating-crank body.	...do....	
Operating-crank spindle nut.....	1	...do....	On inner end operating-crank spindle.	...do....	
Operating-crank spindle sleeve.....	1	Bronze..	On operating-crank spindle.	...do....	
Operating-crank spindle-sleeve nut.....	1	Steel....	In outer end operating-crank spindle sleeve.	...do....	
Operating-crank spindle-sleeve nut pin.....	1	...do....	Secures nut to sleeve.	...do....	
Compound gear.....	1	...do....	On upper end of hinge pin.	...do....	

Parts attached to gun, but removable.

Hinge.....	1	Steel....	Fastened to breech of gun.	Removable only at factory.	Hinge plate, hinge block. Hinge-plate screws; hinge-block screws.
Hinge screws.....	5	...do....	Attach hinge to breech.	...do....	
Tray-latch catch.....	1	...do....	Screwed into breech of gun.	Interchangeable....	
Tray-latch catch-spline screw.....	1	...do....	Screwed into breech of gun and tray-latch catch.	...do....	
Front axial sight.....	1	...do....	Top of trunnion hoop.	...do....	
Rear axial sight.....	1	...do....	Top of gun near breech.	...do....	
Rear axial sight-screws.....	2	...do....	Top of breech of gun.	...do....	
Rear sight plugs.....	2	...do....	Close screw holes when axial sight is removed.	...do....	
Front sight plug.....	1	...do....	...do....	...do....	

10-INCH B. L. RIFLE, MODEL 1895.

Weight, 30 gross tons (67,200 pounds).
Distance between rimbases, 42 inches.
Length of trunnions, 8.75 inches.
Distance of axis of trunnions from muzzle, 240.3 inches.
Total length, 369.15 inches.

Length of bore, 350 inches.

Maximum diameter of breech, 37 inches.

Diameter of muzzle, 17.5 inches.

Diameter of trunnions, 12 inches.

Powder chamber:

Diameter, 11.8 inches.

Length, 65.49 inches.

Capacity, 7,123 cubic inches.

Travel of projectile in bore, 28.451 calibers, 284.51 inches.

Projectile:

Kind.	Armor-piercing shot.	Armor-piercing shell.	Cast-iron shot.
Weight (filled).....pounds..	575	575	575
Ratio of weight to weight of piece.....	1-118	1-118	1-118
Weight of bursting charge, gun cotton.....pounds..	22.40	22.40	22.40
Length.....calibers..	8.50	4.00	8.50
Sectional density $\frac{W}{V}$	7.33	7.33	7.33
Price each (without fuse or bursting charge).....	\$90.00	\$67.00	\$22.25

Powder:

Kind, brown prismatic and smokeless, 10-inch breech-loading rifle

Weight, 280 pounds brown; 140 pounds smokeless.

Density of loading, 1.0886 brown; 0.5441 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.

Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.

Smokeless, 37,000 pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 21.1 inches.

Smokeless, 25.3 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 19.2 inches.

Smokeless, 23 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 16.8 inches.

Smokeless, 20 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 15.1 inches.

Smokeless, 18.1 inches.

Muzzle energy:

Brown, 16,345 foot-tons

Smokeless, 21,086 foot-tons.

Rifling:

Number of grooves, 60.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 30 inches from muzzle, being uniform over the 30 inches.

POWDER NOTE.—The weights given are approximate. The exact weight, giving the standard muzzle velocity, is determined from the acceptance test and issue for charges.

10-INCH B. L. RIFLE, MODEL 1895 M1

(Price of rifle, \$23,150.)

INCLUDES GUN PROPER, BREECH MECHANISM, AND PARTS ATTACHED TO GUN BUT REMOVABLE (SEE LIST BELOW).

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock.....	1	Steel....	In breech.....	Interchangeable....	Block.
Breechblock oil-hole screw.....	1	do....	In breechblock.....	do.....	
Vent cover.....	1	do....	do.....	do.....	
Vent-cover pivot....	1	do....	Holds vent cover to breechblock.	do.....	
Obturator, complete:					
Obturator spindle, complete—					
Obturator spindle.....	1	do....	In breechblock.....	do.....	Spindle, mushroom; also wrongly called obturator.
Vent bushing.....	1	Copper..	Pressed into obturator-spindle head.	do.....	
Pressure-plug screws.....	2	Steel....	In obturator-spindle head.	do.....	
Pressure-plug washers.....	2	do....	On pressure-plug screws.	do.....	
Obturator nut.....	1	do....	On rear end of obturator spindle.	do.....	Obturator-spindle nut.
Obturator locking nut.....	1	do....	do.....	do.....	Lock nut.
Firing attachment, complete.					
Experimental attachments are under test; as soon as adopted list of parts will be furnished for insertion.					
Front split ring....	1	do....	Against rear face of obturator-spindle head.	do.....	Front exterior split ring.
Rear split ring.....	1	do....	In rear of gas-check pad.	do.....	Rear exterior split ring.
Small split ring....	1	do....	do.....	do.....	Spindle split ring, interior split ring.
Filling-in disk....	1	do....	Between front face of breechblock and gas-check pad, etc.	do.....	Disk.
Gas-check pad....	1	Asbestos and tal-low in canvas.	Between obturator-spindle head, split rings, etc.	do.....	Gas-check pad.
Obturator washer—Obturator washer cup, front.	1	Steel....	Between obturator-spindle nut and shoulder in breechblock.	do.....	
Obturator washer cup, rear.	1	do....	do.....	do.....	
Obturator washer connector.	1	do....	Holds cups together..	Not interchangeable.	
Obturator washer balls.	30	do....	Between cups.....	Interchangeable....	
Obturator washer screws.	4	do....	Holds cups and washer together.	do.....	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc
Tray, complete:					
Tray.....	1	Steel...	Fastened to breech...	Interchangeable	Console.
Hinge pin.....	1	...do....	Enters two lugs in hinge.	.....do.....
Hinge-pin nut.....	1	...do....	On hinge pin.....	.....do.....
Hinge-pin nut pin...	1	...do....	In hinge-pin nut.....	.....do.....
Hinge-pin oil-hole screw.	1	...do....	.....do.....	.....do.....
Hinge-pin securing screw.	1	...do....	In hinge and hinge pin.	.....do.....
Tray ball bearing:					
Cups for tray ball bearing.	2	...do....	.....do.....	.....do.....
Connector for tray ball bearing.	1	Copper.	Connects cups.....	Interchangeable, but can not be inserted at fort.	
Balls for tray ball bearing.	27	Steel...	Between upper and lower cups.	Interchangeable	
Tray latch.....	1	...do....	Pivoted to tray.....	.....do.....
Tray-latch pivot.....	1	...do....	Holds tray latch to tray.	.....do.....
Tray-latch spring.....	1	...do....	In tray latch.....	.....do.....
Tray-latch lock bolt.....	1	...do....	In tray.....	.....do.....
Tray-latch lock-bolt spring.	1	...do....	On tray-latch catch bolt.	.....do.....
Tray-latch operating stud.	1	...do....	Between tray latch and tray.	.....do.....
Worm wheel.....	1	Bronze.	Lower end of hinge pin.	Not interchangeable; worm wheel, with its worm shaft fits any gun of this model.	Worm.
Worm shaft.....	1	Steel...	In lower part hinge ..	.....do.....
Worm-shaft bushing ..	1	Bronze.	Inner end worm shaft.	Interchangeable	
Worm-shaft housing...	1	...do....	Screws into hinge; holds worm shaft.	.....do.....
Thrust bearings for worm shaft:					
Thrust-bearing cups.	2	Steel...	On worm shaft; one at inner end; one against housing.	Thrust bearings, as a whole; interchangeable.	
Connectors for thrust bearing.	2	Bronze.	.....do.....	.....do.....
Balls for thrust bearing.	23	Steel...	.....do.....	.....do.....
Operating crank:					
Operating-crank body.	1	...do....	On square end of worm shaft.	Interchangeable	
Operating-crank set screw.	1	...do....	Secures operating-crank body to worm shaft.	.....do.....
Operating-crank spindle.	1	...do....	On outer end operating-crank body.	.....do.....
Operating-crank spindle nut.	1	...do....	On inner end operating-crank spindle.	.....do.....
Operating-crank spindle sleeve.	1	Bronze.	On operating-crank spindle.	.....do.....
Operating-crank spindle-sleeve nut.	1	Steel...	In outer end operating-crank spindle sleeve.	.....do.....
Operating-crank spindle-sleeve nut pin.	1	...do....	Secures nut to sleeve.	.....do.....
Compound gear.....	1	...do....	On upper end of hinge pin.	.....do.....

Parts attached to gun, but removable.

Hinge.....	1	Steel...	Fastened to breech of gun.	Removable only at factory.	Hinge plate, hinge block. Hinge-plate screws, hinge-block screws.
Hinge screws.....	5	...do....	Attach hinge to breech.	.....do.....	
Tray-latch catch.....	1	...do....	Screwed into breech of gun.	Interchangeable	
Tray-latch catch spline screw.	1	...do....	Screwed into breech of gun and tray-latch catch.	.....do.....	
Front axial sight.....	1	...do....	Top of trunnion hoop.....	.....do.....	

Parts attached to gun, but removable—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Rear axial sight.....	1	Steel....	Top of gun near breech.	Interchangeable	
Rear axial-sight screws.....	2	...do....	Top of breech of gun.	.....do.....	
Rear sight plugs.....	2	...do....	Close screw holes when axial sight is removed.	.....do.....	
Front sight plug.....	1	...do....	Close screw hole when axial sight is removed.	.....do.....	

10-INCH B. L. RIFLE, MODEL 1895 M1.

Weight, 30 gross tons (66,700 pounds).

Distance between rimbases, 42 inches.

Length of trunnions, 6.75 inches.

Distance of axis of trunnions from muzzle, 240.3 inches.

Total length, 369.15 inches.

Length of bore, 348.3 inches.

Maximum diameter of breech, 37 inches.

Diameter of muzzle, 17.5 inches.

Diameter of trunnions, 12 inches.

Powder chamber:

Diameter, 11.8 inches.

Length, 65.482 inches.

Capacity, 7,123 cubic inches.

Travel of projectile in bore, 28.2818 calibers, 282.818 inches.

Projectiles:

Kind.	Armor-piercing shot.	Armor-piercing shell.	Cast-iron shot.
Weight (filled).....pounds..	575	575	575
Ratio of weight to weight of piece.....	1-118	1-118	1-118
Weight of bursting charge, gun cotton...pounds..	22.40	22.40	22.40
Length.....calibers..	3.50	4.00	3.50
Sectional density $\frac{W}{P^2}$	7.33	7.33	7.33
Price each (without fuse or bursting charge).....	\$90.00	\$67.00	\$22.25

Powder:

Kind, brown prismatic and smokeless, 10-inch breech-loading rifle.

Weight, 280 pounds brown; 140 pounds smokeless.

Density of loading, 1.0886 brown; 0.5441 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.

Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.

Smokeless, 37,000 pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 21.1 inches.

Smokeless, 25.3 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 19.2 inches.

Smokeless, 23 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 18.6 inches.

Smokeless, 20 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 15.1 inches.

Smokeless, 18.1 inches.

Muzzle energy:

Brown, 16,345 foot-tons.

Smokeless, 21,086 foot-tons.

Muzzle preponderance, 1,165 pounds.

Rifling:

Number of grooves, 60.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 2 calibers at 30 inches from muzzle, being uniform over the 30 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charge

10-INCH B. L. RIFLE, MODEL 1900.

(Price of rifle, \$27,600.)

The official name of parts, the number, material, location, synonymous names, etc for the 10-inch breech-loading rifle, model 1900, are the same as for the 10-inch breech-loading rifle, model 1895.

TELESCOPIC SIGHTS.

One telescopic sight is furnished with each gun for use either on sight standard attached to carriage or on trunnions. (For description of telescopic-sight brackets for holding same, etc., see Handbook of Sights for Cannon, 1899.)

FUSES.

Fuses used with projectiles for 10-inch breech-loading rifles are:

For shell detonating—

“High resistance base fuze, ‘A,’ Model 1900, F. A.”

PRIMERS.

Obturator, electric (screwed), double wire, model 1899, F. A.

Obturator, electric (screwed), single wire, model 1900, F. A.

Obturator, electric (new model), F. A.

Combination electric and friction, model 1900, F. A.

CLEANING MATERIAL.

For allowance of cleaning material, etc., per annum, see Supply Table, pages 35 and 360.

SPARE PARTS FOR GUN.

The following spare parts are issued for 10-inch breech-loading rifle, model 1888, and modifications, to wit:

		Price each.
iring attachment, complete.....	1 per post	\$112.00
as-check pad.....	1 for 2 guns	7.80
ronts split ring	1 per post	14.30
ear split ring	1 per post	10.30
mall split ring.....	1 per post	7.00
ranslating roller	1 per post	20.00
ray latch, complete.....	1 for 3 guns	32.00
ray-spring bolt	1 for 3 guns	5.70
ray-spring bolt spring.....	1 per gun	1.30
ray-spring bolt shoe.....	1 for 3 guns	2.25
ray-spring bolt-shoe screw.....	1 for 3 guns .....	.65
ray-lock bolt.....	1 per post	1.75
ray-lock lever	1 per post	5.20
ray-lock link	1 per post	4.50
ray-lock link pin.....	1 per post .....	.95
ray-lock lever pivot.....	1 per post	1.30
ray-lock pin	1 per post	4.50
ray-lock pin nut.....	1 per post .....	.40
ray-lock pin-nut pin	1 per post .....	.20
ray back-latch catch	1 per post	5.20
otating-crank lock bolt	1 per post	3.25
otating-crank lock spring.....	1 per post .....	.65
otating-crank lock washer.....	1 per post .....	.32
otating-crank lock handle.....	1 per post	3.25
otating-crank lock-handle pin.....	1 per post .....	.32
ent cover	1 per post	7.75
ray back latch	1 per post	21.50
ranslating crank.....	1 per battery	32.00
ranslating stud	1 per battery	25.00
otating-crank lock plate, upper.....	1 per battery	1.75
otating-crank lock plate, lower	1 per battery	1.75
otating-crank lock screws.....	1 set per battery ..	.32
inge-pin oil-hole screws	2 per gun .....	.32
reechblock oil-hole screws	2 per gun .....	.32

The following spare parts are issued for 10-inch breech-loading rifle, model 1885, and modifications:

		Price each.
ent cover	1 per post	\$6.00
ront split ring	1 per post	11.00
ear split ring.....	1 per post	11.00
mall split ring.....	1 per post	5.00
as-check pad.....	1 for 2 guns	6.00
bturator washer	1 per post	20.00
ray ball bearing	1 per post	15.00
ray latch	1 per post	17.00
ray-latch spring	1 per gun .....	.50
ray-latch lock bolt	1 for 2 guns	1.50
ray-latch lock-bolt spring	1 per gun .....	.50

		Price each.
Tray-latch operating stud	1 for 2 guns	\$0.30
Thrust bearings for worm shaft.....	2 per post	7.50
Firing attachment, complete.....	1 per post	112.00
Hinge-pin oil-hole screws	2 per gun.....	.65
Breechblock oil-hole screws	2 per gun.....	.32

NOTE.—A set of spare parts as enumerated above should always be kept on hand at post.

In ordering spare parts always give the name of maker, model, and number of gun for which parts are required.

See note on page 43 relative to spare parts.

SUBCALIBER TUBES.

One-pounder subcaliber tubes are issued for use with 10-inch breech-loading rifles, one per model to each post having guns of this caliber mounted. The list of parts of tube and fixtures are as follows:

List of parts of subcaliber tube and fixtures.

1 gun.	1 rear adapter.
1 adapter clamp wedge.	1 center support.
1 clamp wedge screw.	1 front adapter.
1 thread clamp screw.	

ACCESSORIES AND SPARE PARTS FOR SUBCALIBER TUBE.

The following accessories and spare parts are furnished with each subcaliber tube for 10-inch breech-loading rifle:

1 hand extractor.	1 securing screw wrench.
1 handspike.	1 adjusting wrench (for model 1888).
1 bristle sponge.	1 adjusting wrench (for model 1895).
1 sponge rod.	1 oil can.
1 locating gauge.	1 breech cover (or cover for).
1 clamping wrench (for both clamp screws).	1 muzzle cover (entire tube).
1 clip extractor.	1 vent cleaner.
1 obturator spindle plate.	1 thread clamp screw.
2 securing screws.	1 storage chest.

Subcaliber tubes and fixtures when not in use should always be kept in the special storage chest issued for that purpose.

For more complete description of subcaliber tubes see pamphlet "Directions for using, mounting, etc., of 1-pounder subcaliber tubes," issued by the Ordnance Department, United States Army. (Price of subcaliber tube accessories and spare parts, \$410.)

DECAPPING TOOLS.

There are issued to each post, equipped with 10-inch breech-loading rifle, one set of tools for decapping and cleaning 1-pounder subcaliber ammunition. These sets are termed "Decapping and cleaning sets for 1-pounder subcaliber ammunition," and are composed of the following:

	Price each.
1 decapping spindle	\$
1 decapping anvil	
1 cleaning brush.....	
Total.....	per set.. 2.50

10-INCH BARBETTE CARRIAGE, MODEL 1893.

(Price of carriage, \$8,743. 25.)

Weights of principal parts.

Name of part.	Number of pieces.	Weight.
		<i>Pounds.</i>
Top carriage.....	1	9,157
Chassis cheeks.....	2	15,048
Upper roller path.....	1	10,845
Lower roller path.....	1	25,680
Elevating apparatus:		
Rack.....	1	90
Pinion.....	1	15
Pinion shaft.....	1	27
Worm wheel.....	1	70
Worm.....	1	31
Shaft for worm.....	1	38
Mitters.....	6	50
Shaft for miter.....	1	15
Do.....	1	70
Friction clamp.....	1	10
Crank shaft.....	1	150
Crank.....	2	40
Traversing apparatus:		
Chain.....	1	160
Sprocket wheel.....	1	61
Shaft for sprocket wheel.....	1	68
Bevel gears.....	2	97
Shaft for spur wheel.....	1	50
Spur wheel.....	1	80
Pinion.....	1	20
Crank shaft.....	1	140
Crank.....	2	40
Guide wheels.....	2	28
Front guide hook (bracket).....	1	450
Chain connections.....	2	16
Hoisting apparatus:		
Crane.....	1	325
Block.....	1	20
Drum.....	1	95
Drum shaft.....	1	24
Pinion.....	1	18
Pinion shaft.....	1	23
Pawl.....	1	8
Crank.....	1	19
Spur wheel.....	1	85
Ratchet wheel.....	1	8
Conical rollers.....	20	2,860
Recoil rollers.....	20	2,095
Journals for recoil rollers.....	20	875
Guide hook.....	1	240
Piston rods and heads.....	2	785
Piston nuts.....	4	50
Stuffing boxes.....	2	310
Rear cylinder covers.....	2	254
Throttling bars.....	4	140
Distance rings.....	2	750
Braces for rings.....	10	180
Dust guards.....	2	200
Dust cap.....	1	48
Loading platform.....	1	2,576
Sliding platform.....	1	475
Front transom.....	1	610
Bolts, nuts, etc.....		1,310
Carriage.....	142	77,454

List of the parts, location, material, correct nomenclature, etc., of 10-inch barbette carriage, model 1893.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Asimuth circle....	On base ring (lower roller path).	Brass.....	1	Inch.	Inch.		Made in sections.
Asimuth pointer ..	On azimuth-pointer bracket.	do.....	1				With 2 dowels 1 inch diameter.
Asimuth-pointer bracket.	Bolted to rear of right chassis.	Steel.....	1				
Ball-bearing washers.	Elevating-worm shaft...	Steel, hardened.	4	4.25			Top and bottom part.
Ball-bearing balls.	Between washers.....	do.....	92	.25			
Ball-bearing covers.	Over ball-bearing washer.	Brass.....	2				
Base ring (lower roller path).	On platform.....	Gun iron.....	1				
Bearings for elevating side shaft.	Bolted to right chassis ..	Cast steel, No. 1	2				
Bearing for elevating crank shaft.	Bolted to racer (upper roller path).	do.....	2				
Bearing for elevating vertical shaft (upper).	Bolted to right chassis ..	do.....	1				
Bearing for elevating vertical shaft (lower).	do.....	do.....	1				
Bolts connecting chain to lug.	Connects traversing chain to lug on base ring.	Steel.....	2				Nut, washer, pin, and split pin.
Bolts (counter-sunk head).	Guard for sliding plate to platform.	Wrought iron.	2	.75	3.5	2	
Do.....	Guides for sliding plate to platform.	do.....	18	.75	2.875	18	
Do.....	Platform plate to T-iron frame.	do.....	14	.75	2.875	14	
Bolts (hexagonal head).	Asimuth-pointer bracket to chassis.	do.....	4	.75	1.75		Tap bolt.
Do.....	Bearing for elevating crank-shaft racer.	do.....	4	1	2.875		Do.
Do.....	Bearing for elevating square shaft to chassis.	do.....	4	.875	2.625		
Do.....	do.....	do.....	4	.875	2.875		Tap bolt.
Do.....	Braces for loading platform to chassis.	do.....	4	1	2.5		Do.
Do.....	Bracket for loading platform to chassis.	do.....	24	.875	2		Do.
Do.....	Chassis to racer (or upper roller path).	do.....	10	1.75	4.25		Do.
Do.....	do.....	do.....	4	1.75	4.5		Do.
Do.....	do.....	do.....	2	2	4.25		Do.
Do.....	Elevating rack to gun...	Steel.....	2	1.125	3.625		Do.
Do.....	do.....	do.....	2	1.125	4.25		Do.
Do.....	Elevation indicator counterweight.	do.....	1	.5	.5		
Do.....	Guide hooks or clips to racer or upper roller path.	do.....	10	1.625	5.125		Tap bolt, 6 steel bolts for front clip, 4 wrought-iron bolts for rear clip.
Do.....	Loading platform to chassis.	do.....	8	.875	1.625		Tap bolt.
Do.....	do.....	Wrought iron.	24	.75	1.5		Do.
Do.....	Loading platform to bracket.	do.....	24	.75	2.125	24	
Do.....	Pawl to chassis.	Steel.....	1	1		1	
Do.....	Plug for filling holes....	Wrought iron.	2	1.25	2		Copper washer.
Do.....	Railing to platform.	do.....	48	.625	1.125		Tap bolt.
Do.....	Retraction hook to chassis.	do.....	6	1	8.25		Do.
Do.....	do.....	do.....	2	1	2.5		Do.
Do.....	Retraction hook to top carriage.	do.....	4	1.25	3		Do.
Do.....	Retraction drum shaft and worm-wheel brackets.	do.....	8	1	2.75		Do.
Do.....	Retraction worm-shaft bracket.	do.....	2	1	2.5		Do.
Do.....	Retraction worm wheel to drum.	do.....	6	.75	1.5		Do.

a Over all.

List of the parts, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Bolts (hexagonal head).	Stand for chassis sight to chassis.	Wrought iron.	4	$\frac{1}{8}$ in.	$\frac{1}{8}$ in.	1,875	Tap bolt.
Do.....	Step hanger to racer (upper roller path).	do.....	4	.75	1.75	...	Do.
Do.....	Throttling bars to cylinders.	Steel.....	36	.75	...	...	Tap bolt, with lead washers.
Do.....	Transom to front of chassis.	Wrought iron.	12	1.25	3	...	Tap bolt.
Do.....	Trunnion cap to top carriage.	do.....	4	1.25	3.75	...	Do.
Bolt (round head).	Bracket for crane guide sheave.	do.....	1	.75	2.25	1	
Do.....	Bracket for sliding plate.	do.....	2	1.5	6.625	2	
Do.....	Distance rings together.	do.....	10	1	14.875	10	
Do.....	Sliding plate connection to top carriage.	do.....	2	1.5	6.625	2	
Bolts (square head)	Braces for loading platform to plate.	do.....	4	.875	3.5	4	
Do.....	Chassis to racer (upper roller path).	do.....	14	1.75	6.25	14	
Do.....	do.....	do.....	4	1.75	6.75	4	
Do.....	End brace to platform.	do.....	8	.625	1.75	8	
Do.....	do.....	do.....	8	.625	2.25	8	
Do.....	Guard for sliding plate to platform.	do.....	2	.5	3.25	2	
Do.....	Lower bearing for vertical shaft to chassis.	do.....	4	1	5.125	4	
Do.....	Platform plate to T.....	do.....	14	.5	1.625	14	
Do.....	Plug for equalizing holes.	do.....	2	$\frac{1}{8}$ in.	3	...	Copper washer.
Do.....	Step braces to platform.	do.....	16	.75	1.875	16	
Do.....	Steps to step hanger.	Steel.....	4	.75	1	...	
Do.....	Tie braces to T.....	Wrought iron.	8	.75	1.875	8	
Do.....	Upper bearing for vertical shaft to chassis.	do.....	2	1.125	6.125	2	
Bolts (special).....	Plug for emptying holes.	do.....	2	$\frac{1}{8}$ in.	...	...
Braces for distance rings.	Between inner and outer distance rings.	Cast iron	10	2.125	11.5	...	
Braces for loading platform.	Loading platform to chassis.	Wrought iron.	2	1.25	...	...
Brass sleeves.....	On crank handles.....	Brass.....	5	$\frac{1}{8}$ in.	16	...	
Bracket for crane guide sheave.	On crane mast.....	Wrought iron.	1	...	...	...
Brackets for loading platform.	Loading platform to chassis.	Cast steel, No. 1	4	...	...	...
Brackets for sliding plate.	Sliding plate to connecting rods.	Wrought iron.	2	...	...	...
Bracket for retraction drum shaft.	Bolted to racer (upper roller path).	Cast iron.....	1	...	...	...
Bracket for retraction worm shaft.	do.....	do.....	1	...	...	...
Bracket for retraction worm wheel.	do.....	do.....	1	...	...	...
Buffers, counter recoil (female).	In rear cylinder head...	Bronze, No. 1.	2	...	...	...
Buffers, counter recoil (male).	Screwed into piston rod.	Forged steel, No. 3.	2	...	...	...
Bushings.....	Bearing for elevating square shaft.	Bronze, No. 1.	2	...	...	...
Do.....	Bearing for elevating crank shaft.	do.....	2	...	...	...
Do.....	Bearing for upper elevating vertical shaft.	do.....	1	...	...	...
Do.....	Bearing for lower elevating vertical shaft.	do.....	1	...	...	...
Do.....	Chassis.....	do.....	11	...	...	...	Three sizes.
Do.....	Clip or guide hook (front).	do.....	3	...	...	...	Two sizes.
Do.....	Recoil rollers.....	do.....	20	...	...	...
Do.....	Retraction drum-shaft bracket.	do.....	1	...	...	...
Do.....	Retraction worm-shaft bracket.	do.....	1	...	...	...
Do.....	Retraction worm-wheel bracket.	do.....	1	...	...	...
Do.....	Retraction crank shaft.	do.....	2	...	...	...
Do.....	Top carriage.....	do.....	4	...	...	...

^a Gas tap.

^b Inside.

List of the parts, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Bushings	Trunnion-bed top carriage.	Bronze, No. 1.	2	In.	In.		
Chain (for traversing carriage).	Around base ring (lower roller path).	Wrought iron.	1		320		Bolts, nuts, washers, pin, and split pin connecting chain to lugs on base ring.
Do	Attached to crane ratchet pawl.	do	1		7		
Chain lugs	On base ring.	Gun iron	2				
Chassis (right and left).	Bolted to racer (upper roller path).	Cast steel, No. 2	2				
Clips (guide hooks front and rear).	do	Cast steel, No. 1	2				
Collar	Elevating side shaft.	Steel	1				$\frac{1}{4}$ -inch set screw.
Do	Elevating crank shaft.	do	2				Two $\frac{1}{4}$ -inch set screws.
Do	Elevating miter side-shaft gear.	Bronze, No. 1.	1				$\frac{1}{4}$ -inch taper pin.
Do	Traversing crank shaft.	Steel	1				$\frac{1}{4}$ -inch set screw.
Do	Crane crank shaft.	do	1				$\frac{1}{4}$ -inch pin.
Do	Retraction crank shaft.	do	1				$\frac{1}{4}$ -inch set screw.
Do	Retraction worm shaft.	do	1				$\frac{1}{4}$ -inch key and $\frac{1}{4}$ -inch set screw.
Do	Elevating worm-wheel shaft.	do	1				Planned to shaft.
Connecting rods.	Sliding plate to top carriage.	Wrought iron.	2				
Counterweight.	On elevation indicator pointer.	Bronze	1				Set screw.
Covers	On racer.	Wrought iron.	9				
Do	Retraction worm-wheel bracket.	Sheet steel	1				
Crane mast.	Rear of left chassis.	Wrought iron.	1				$\frac{5}{8}$ -inch bronze washer.
Crane crank shaft.	Through left chassis.	Steel	1				Two $\frac{1}{4}$ -inch keys, collar, pin, and nut.
Crane guide sheave.	In bracket on crane mast.	Bronze	1				
Crane guide sheave journal.	Through bracket and sheave.	Wrought iron.	1				$\frac{3}{8}$ -inch split pin.
Crane gear.	Inside of left chassis on drum shaft.	Bronze	1				68 teeth, 4 pitch, $\frac{1}{2}$ by $\frac{1}{4}$ inch key.
Crane pinion.	Inside of left chassis on crank shaft.	Steel	1				16 teeth, 4 pitch, $\frac{1}{2}$ by $\frac{1}{4}$ inch key.
Crane drum shaft.	Through left chassis.	do	1				Two $\frac{1}{2}$ by $\frac{1}{4}$ inch keys and 2 nuts.
Crane drum.	On drum shaft outside of left chassis.	Cast iron	1				$\frac{1}{2}$ by $\frac{1}{4}$ inch key.
Crane sheaves.	At the upper end of crane mast.	Bronze	2				
Crane sheave journal.	Through sheave.	Wrought iron.	1				$\frac{1}{4}$ -inch split pin.
Crane ratchet pawl.	Bolted to outside of left chassis.	do	1				Eye bolt, chain and pin attached.
Crane rope hook and eye.	For crane.	Manila	1				46 feet of rope, with hook and eye attached.
Crane ratchet wheel.	On crank shaft outside of left chassis.	Bronze	1				16 teeth, $\frac{1}{2}$ by $\frac{1}{4}$ inch key.
Crane block sheave.	On crane block.	do	1				
Crane block sheave journal.	Through crane block sheave.	Wrought iron.	1				$\frac{1}{4}$ -inch split pin.
Crane block hook.	On crane block.	do	1				$\frac{1}{4}$ -inch nut.
Cranks	For elevating crank shaft.	do	2				With brass sleeve.
Do	For traversing crank shaft.	do	2				Do.
Do	For crane crank shaft.	do	1				Do.
Cylinder heads (rear).	Rear end of top carriage cylinders.	Cast steel, No. 2	2				Fiber packing between head and cylinder.
Direction plates.	For elevation and depression on chassis.	Bronze	2				With eight $\frac{1}{4}$ -inch screws.
Do	For traversing on chassis.	do	2				Do.
Distance ring.	Traversing rollers (inner).	Wrought iron.	1				
Do	Traversing rollers (outer).	do	1				
Dust guards.	For traversing rollers, bolted to racer.	Sheet steel	1				Forty $\frac{1}{4}$ -inch screws.

List of the parts, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Elevating rack	Bolted to gun	Bronze, No. 8.	1	In.	In.		174 teeth on the circle, 1.75 cdr. pitch.
Elevating crank shaft.	Through chassis.....	Steel.....	1				$\frac{1}{8}$ by $\frac{1}{2}$ inch key, two $\frac{3}{4}$ -inch collars with $\frac{1}{2}$ -inch set screws.
Elevating miter gear.	On elevating apparatus..	Bronze	6				16 teeth, 1.25 cdr. pitch, four $\frac{1}{2}$ -inch spline screws.
Elevating pinion..	On elevating worm-wheel shaft.	Forged steel, No. 8.	1				11 teeth, 1.75 cdr. pitch, $\frac{1}{8}$ by $\frac{1}{2}$ -inch key, $\frac{1}{2}$ -inch spline screws.
Elevating side shaft	Right chassis, outside ...	Steel.....	1				$\frac{1}{8}$ by $\frac{1}{2}$ inch key, one $\frac{3}{4}$ -inch collar with $\frac{1}{2}$ -inch set screws, $\frac{3}{4}$ -inch washer, $1\frac{1}{2}$ -inch nut, and two $\frac{1}{2}$ -inch spline screws.
Elevating vertical miter shaft.	.....do .....	.....do	1				Two $\frac{1}{8}$ by $\frac{1}{2}$ inch keys and two $\frac{1}{2}$ -inch spline screws.
Elevating worm...	On elevating worm shaft	Forged steel, No. 8.	1				Right threads, 1.5 pitch, $\frac{1}{8}$ by $\frac{1}{2}$ inch key.
Elevating worm shaft.	Through bearings on right of top carriage.	Steel.....	1				Two $\frac{1}{8}$ by $\frac{1}{2}$ inch keys, $\frac{1}{2}$ -inch spline screw, $1\frac{1}{2}$ -inch nut and collar pinned to shaft.
Elevating worm wheel.	On worm-wheel shaft....	Bronze, No. 1..	1				33 teeth, $1\frac{1}{2}$ cdr. pitch.
Elevating worm-wheel shaft.	Through bearings on top of top carriage.	Steel.....	1				Two $\frac{1}{8}$ by $\frac{1}{2}$ inch keys, $\frac{1}{2}$ -inch spline screw, 2-inch nut.
Elevation indicator arc.	Bolted to top carriage...	Bronze	1				4 bronze screws.
Elevation indicator pinion.	Studded to top-carriage cap.	.....do	1				20 teeth, $\frac{1}{2}$ pitch.
Elevation indicator pointer.	On elevation indicator stud.	.....do	1				
Elevation indicator stud.	Screwed into top-carriage cap.	Steel.....	1				Nut, washer, and lock pin.
Elevation indicator wheel rack.	Bolted to trunnion of gun.	Bronze	1				100 teeth, $\frac{1}{2}$ pitch, 2 screws.
End brace to loading platform.	End of loading platform.	Steel.....	1				
Equalizing pipe connection nipples.	Screwed into top carriage.	.....do	2				
Equalizing pipe unions.	Connect copper pipe and nipple.	Bronze	2				Steel washer—fiber washer between nipple and pipe.
Friction clamp....	On elevating worm wheel.	Forged steel, No. 2.	1				$\frac{1}{8}$ by $\frac{1}{2}$ inch key.
Guide hook or clip (rear).	Bolted to racer	Cast steel, No. 1.	1				Six $1\frac{1}{2}$ -inch bolts (steel).
Guide hook or clip (front).	.....do .....	.....do	1				Four $1\frac{1}{2}$ -inch bolts (wrought iron).
Guide for sliding plates.	Bolted to loading platform.	Bronze	2				
Implement box ...	One with each carriage..	Ash.....	1				
Loading platform.	Bolted to rear of chassis.	Sheet steel...	1				
Oil cans	In implement box.....	Brass	2				One with valve 1 quart and one $\frac{1}{2}$ pint.
Oil plugs	For all oil holes .....	.....do					Two sizes, $\frac{1}{2}$ -inch and $\frac{3}{4}$ -inch.
Name plate.....	On right chassis outside.	Bronze	1				3 screws.
Pipe	For equalizing connection.	Copper	1				4 feet $\frac{1}{2}$ inch inside, $\frac{3}{4}$ inch outside.

List of the parts, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Piston covers	For piston head	Bronze	2	In.	In.	.....
Piston heads	Screwed onto piston rod.	Forged steel, No. 8.	2	.....	.....	.....	2 spline screws.
Piston rods	In recoil cylinders .....	.....do.....	2	.....	.....	.....	4 nuts.
Platform for chassis sight.	Bolted to loading platform.	Sheet steel.....	1	.....	.....	.....
Racer (upper roller path).	On traverse rollers	Cast steel, No. 1.	1	.....	.....	.....
Railing	On loading platform	Wrought-iron pipe.	.....	.....	.....	.....	Elbows and tees.
Retraction block sheaves.	Retraction block	Bronze, No. 3.	8	.....	.....	.....
Retraction block sheaves journals.	Through block and sheave.	Steel.....	4	.....	.....	.....	With nuts and pins.
Retraction block cheeks.	For retraction blocks.....	.....do.....	12	.....	.....	.....
Retraction block clevis.	.....do.....	.....do.....	4	.....	.....	.....	With bolts, nuts, and pins.
Retraction block separators.	.....do.....	.....do.....	6	.....	.....	.....	Do.
Retraction crank shaft.	Through chassis.....	.....do.....	1	.....	.....	.....	$\frac{1}{4}$ -inch square key, collar, and set screw.
Retraction drums.	On retraction drum shaft	Bronze	2	.....	.....	.....	Right and left.
Retraction drum shaft.	Through chassis.....	Steel	1	.....	.....	.....	Two $\frac{1}{4}$ -inch square keys and two $\frac{1}{4}$ -inch spline screws.
Retraction hooks to chassis.	Bolted to chassis	Cast steel, No. 2	2	.....	.....	.....	Right and left.
Retraction hooks to top carriage.	Bolted to top carriage.....	.....do.....	2	.....	.....	.....	Do.
Retraction miter gears.	On retraction crank and worm shaft.	Steel.....	2	.....	.....	.....	22 teeth, 4 pitch.
Retraction ropes...	For retraction device....	Manila	2	.....	.....	.....	2 ropes 60 feet long $\frac{1}{4}$ inch in diameter, with hook and eye attached.
Retraction worm..	On retraction worm shaft	Steel, No. 3...	1	.....	.....	.....	$\frac{1}{4}$ -inch square key, 2.77-inch p. d., 2-inch lead.
Retraction worm shaft.	Through bearings bolted to racer.	Steel.....	1	.....	.....	.....	$\frac{1}{4}$ -inch square key, $\frac{1}{4}$ -inch keyway, collar, and set screw.
Retraction worm wheel.	Bolted to drum on drum shaft.	Bronze, No. 8.	1	.....	.....	.....	60 teeth, $\frac{1}{4}$ cir. pitch.
Rivets for sliding bracket.	For sliding bracket.....	Wrought iron.	10	0.75	.....	.....
Roller path (upper) (racer).	On traverse rollers	Cast steel, No. 1	1	.....	.....	.....
Roller path (lower) (base ring).	On platform.....	Gun iron.....	1	.....	.....	.....
Rollers, recoil	In pockets of chassis	Forged steel, No. 8.	20	10	.....	.....
Rollers, recoil journals.	Through recoil rollers.....	.....do.....	20	2.5	.....	.....
Rollers, traversing conical.	On lower roller path (base ring).	.....do.....	20	.....	.....	.....
Screws (counter-sunk head).	Bushings to trunnion bed.	Brass	16	.75	± 1.25	.....
Do.....	Covers to racer (upper roller path).	Wrought iron.	68	.625	± 1.375	.....
Do.....	Direction plates to chassis.	Brass	16	.25	$\pm .6$	.....
Do.....	Guides for sliding plate to platform.	Wrought iron.	22	.3125	$\pm .75$	.....
Do.....	Guide-wheel stud to clip	.....do.....	2	.5	.....	.....
Do.....	Lining to lateral bearing on top carriage.	Tobin bronze.	86	.3125	$\pm .9875$	.....
Do.....	Piston cover to piston	Brass	56	.3125	.....	.....
Screws (headless) ..	Miter gears and elevating pinion.	Steel.....	5	.75	1	.....
Do.....	Piston to rod.....	.....do.....	2	.75	1	.....
Do.....	Retraction drum to shaft	.....do.....	2	.75	1	.....
Do.....	Retraction miter gears and shaft collars.	.....do.....	4	.5	.875	.....

a Over all.

List of the parts, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Notes.	Remarks.
Screws (headless) ..	Shaft to sprocket wheel.	Steel	2	In.	In.		
Screws (hexagonal head).	Leveling screws in base ring.	Bronze, No. 2.	8	0.75	1		Thrust plates.
Screws (round-head).	Asimuth pointer to bracket.	Brass	2	.875	.75		
Do	Collars to elevating crank shaft.	Steel	2	.5	.875		
Do	Collars to elevating side shaft.	do	2	.5	.875		
Do	Collars to traversing crank.	do	1	.5	.875		
Do	Dust guard to racer (upper roller path).	Wrought iron.	40	.875	1		
Do	Elevation indicator arc.	do	4	.5			
Do	Elevation indicator wheel.	do	2	.625			
Do	Worm-wheel bracket cover.	do	8	.875	.75		
Screw-driver	For dust guard	do	1				
Do	For recoil-roller journals.	do	1				
Do	For general use	do	1				With wooden handle.
Screw eyes	For extracting follower ..	do	2				
Shot trays	For hoisting shot	do	7				
Sliding plate connections.	Top carriage to connecting rods.	do	2				
Sliding platform guard.	Bolted to rear of loading platform.	Forged steel ..	1				
Sliding plate	On loading platform	Sheet steel ..	1				
Standard	For chassis sight, bolted to right chassis.	Bronze	1				
Steps (set)	To loading platform	Sheet steel ..	2				
Step braces	do	Steel	4				
Step hangers	To racer (upper roller path).	Forged steel ..	2				
Steps	On step hangers	do	4				Roughened with a pricking tool.
Stop bolts and nuts.	On shot tray	Wrought iron.	7				
Stops	do	Bronze	7				
Stop springs	do	Spring steel ..	7				
Stops	Bolted to chassis	Steel	2				
Stuffing boxes	Screwed into front end of cylinder.	Bronze, No. 1.	2				Fiber gasket between box and head. 12 rings of Garlock packing 0.875-inch square are used.
Stuffing-box followers.	In stuffing box	do	2				
Stuffing-box glands.	do	do	2				
Studs	On front guide hook (clip).	Forged steel, No. 2.	2				Two 1/4-inch lock keys, two 1/4-inch screws, two nuts.
Tie brace	Tie to T's on platforms ..	Iron	1				
Throttling bars	Bolted in cylinders	Forged steel ..	4				Thirty-six 1/4-inch bolts with lead washer.
Top carriage	On recoil rollers	Cast steel, No. 2.	1				
Top-carriage caps ..	Bolted to top carriage ..	do	2				
Transom	Bolted to front of chassis.	Steel, No. 1.	1				
Traversing bevel gear.	Upper end of sprocket-wheel shaft.	Bronze, No. 1.	1				84 teeth, 1.5 cir. pitch, 1/4 by 1/4 inch key, and 1/4-inch spline screw.
Traversing bevel pinion.	On spur-wheel shaft	Steel, No. 2.	1				17 teeth, 1.5 cir. pitch, 0.45 by 0.65 inch key.
Traversing chain guide wheels.	On stud (front) clip (guide hook).	Wrought iron.	2				
Traversing crank shaft.	Through chassis	Steel	1				1/4 by 1/4 inch key, 84-inch collar with set screw.
Traversing sprocket wheel.	Lower end of sprocket-wheel shaft.	Cast iron	1				1/4 by 1/4 inch key and 1/4-inch spline screw.
Traversing sprocket-wheel shaft.	Through (front) clip (guide-hook bearings).	Steel	1				Two 1/4 by 1/4 inch keys and two 1/4-inch spline screws.

List of the parts, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Traversing spur gear.	On spur-wheel shaft.....	Bronze, No. 1.	1	In.	In.		76 teeth, 1 cir. pitch, 0.45 by 0.66 inch key.
Traversing spur pinion.	On traversing crank shaft.	Steel, No. 2....	1				19 teeth, 1 cir. pitch, $\frac{1}{4}$ by $\frac{1}{2}$ inch key.
Traversing spur-wheel shaft.	Through right chassis and bearing on clip.	Steel.....	1				Two 0.45 by 0.66 inch key.
Washers.....	For bolt connection traversing chain.	do.....	2				
Do.....	For crane mast.....	Bronze.....	1	5.25			
Do.....	For elevating side shaft.	Steel.....	1	3.5			
Do.....	For stud elevation indicator.	do.....	1	1.1			
Do.....	For equalising pipe connection.	do.....	2				
Wrenches.....	For piston-rod nuts.....	Forged steel..	2				
Wrench (bar).....	For cylinder head.....	do.....	1				
Wrench (box).....	For friction clamp.....	do.....	1				
Do.....	For guide hook or clip..	Wrought iron..	1				
Do.....	For elevating rack.....	do.....	1				
Wrench (double)...	For $\frac{1}{2}$ by $\frac{1}{2}$ inch nuts.....	Forged steel..	1				
Do.....	For $\frac{1}{2}$ by 1 inch nuts.....	do.....	1				
Do.....	For $\frac{1}{2}$ by 1 $\frac{1}{2}$ inch nuts.....	do.....	1				
Wrench (single)...	For 1-inch nuts.....	do.....	1				
Do.....	For 1-inch nuts.....	do.....	1				
Do.....	For 1 $\frac{1}{2}$ -inch nuts.....	do.....	1				
Do.....	For 1 $\frac{1}{2}$ -inch nuts.....	do.....	1				
Do.....	For 2-inch nuts.....	do.....	1				
Do.....	For 2-inch nuts.....	do.....	1				
Wrench (spanner)...	For stuffing box.....	do.....	1				

AMMUNITION TRUCK.

(Price of ammunition truck, each separately, \$75.61.)

(Price of shot-tongs each \$16.90.)

Axle.....	For ammunition truck..	Steel.....	1	1.75	29.25	2	Two 2 $\frac{1}{2}$ -inch bronze washers.
Bolts.....	Diagonal braces to bracket.	Wrought iron..	4	.5		4	
Braces (diagonal) ..	Front and rear frame to bracket.	Steel.....	4				
Brackets.....	On truck axle.....	Cast iron.....	2				Two $\frac{1}{2}$ -inch taper pins.
Bushings.....	For truck wheels.....	Bronze.....	2	1.5	2.5		$\frac{1}{2}$ -inch thick.
Do.....	For guide wheels.....	do.....	2	1	3		
Cartridge pans.....	On pan supports.....	Steel.....	2				
Frame (front).....	On truck.....	do.....	1				
Frame (rear).....	do.....	do.....	1				
Frame (top) or top rail.	do.....	do.....	1				
Guide wheels.....	On front and rear of truck.	Cast steel.....	2	5.9			With rubber tire.
Guide-wheel journals.	Through guide wheel...	Steel.....	2				$\frac{1}{2}$ -inch split pin.
Handle.....	Rear of top frame or rail.	Ash.....	1				Two $\frac{1}{2}$ -inch rivets.
Oil plugs.....	For oil holes.....	Brass.....	4	.375			
Supports.....	Riveted to front and rear frames.	Steel.....	4				$\frac{1}{2}$ -inch rivets.
Do.....	Riveted to top frame or rail.	do.....	3				Do.
Washers.....	On axle.....	Bronze.....	2	2.25			
Wheels.....	do.....	Cast steel.....	2	24.4			With rubber tires.

10-INCH DISAPPEARING CARRIAGE, L. F., MODEL 1894.

(Price of carriage, \$15,750; price of ammunition trucks separately, each \$150.37.)

Weight of the principal parts.

Name.	Weight.
Chassis, racer, top carriage, transoms, traversing-wheel transom, traversing wheels, and all gearing (assembled).....	<i>Pounds.</i> 67,000
Base ring and distance rings.....	11,450
Racer.....	7,200
Traversing circle (4 segments).....	12,500
Crane.....	753
Elevating arms.....	1,556
Gun levers, with axle, crosshead, and suspension rods.....	16,063
Elevating band.....	735
Bottom plate for counterweight.....	1,905
Lead counterweight.....	79,000
Top carriage, with pistons, etc.....	11,985
Chassis (right and left).....	24,000
Front transom.....	1,000
Rear transom.....	1,880
Traversing-wheel transom.....	4,170
Total weight of carriage, including lead counterweight.....	240,158

List of the parts of carriage, location, material, correct nomenclature, etc.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				<i>Inch.</i>	<i>Inch.</i>		
Asimuth circle....	On traversing circle....	Brass.....	1				
Asimuth pointer..	On traversing-wheel transom.	Sheet brass...	1				
Base ring.....	On platform.....	Gun iron.....	1				
Ball-bearing washer.	Traversing-worm shaft..	Hardened steel.	4				Copper wire for erecting.
Ball-bearing balls.	Between washers.....	Steel.....	44				For two bearings.
Bolts (hexagonal head).	Chassis to racer.....	Wrought iron.	34	1½	3½		
Do.....	Crane stop.....	do.....	2		2½	2	
Do.....	Crane bracket to frame.	do.....	3		2½		
Do.....	Crane spring.....	do.....	2		1½		
Do.....	Cross-head pawl springs.	do.....	8		1		
Do.....	Dust guard for rollers to racer.	do.....	40		1		
Do.....	Dust-guard joint plates.	do.....	32	1	0		
Do.....	Elevating-arm truss, upper end.	do.....	2	1½	4½		
Do.....	Elevating-arm truss, lower end.	do.....	2	1½	6½		
Do.....	Elevating-rack journal.	do.....	2	2	3		With washer.
Do.....	Elevating-rack stop plate.	do.....	4	1½	2½		
Do.....	Elevating-rack guides.	do.....	44	1½	3½		
Do.....	Elevating-band set screw.	Hardened steel.	2	1½	7½		Special bolt.
Do.....	Elevating-band clamp bolt.	Wrought iron.	1	2½	7½		
Do.....	Elevating-rack buffer bracket.	do.....	4	1½	6½		
Do.....	Elevating-clamp bracket.	do.....	2		2½		
Do.....	Elevating clamp.	Steel.....	1	1½	19	2	
Do.....	Equalizing-pipe straps.	Wrought iron.	6		1		
Do.....	Gun-lever handle.....	do.....	2		1½		
Do.....	Piston-rod bracket.....	do.....	2	1½	3		
Do.....	Pawl lever.....	Steel.....	2		1½		Special set screw.
Do.....	Pawl spring.....	Wrought iron.	8		1½		
Do.....	Recoil-buffer bracket.	do.....	8	1½	12½	8	
Do.....	do.....	do.....	4	2	16½	4	
Do.....	Racer clip.....	do.....	4	1½	4		
Do.....	Retraction-gear bracket.	do.....	6	1½	3		
Do.....	Sight-standard bracket.	do.....	4	1½	3½		
Do.....	do.....	do.....	4	1½	3		
Do.....	Sight-standard caps.	do.....	8		2		
Do.....	Sight-standard platform ladder.	do.....	2		1½		

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Bolts (hexagonal head).	Throttling bars.....	Wrought iron.	16	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.		Special bolts with lead packing.
Do.....	do.....	do.....	24	1	$\frac{3}{4}$		Do.
Do.....	Top-carriage platform brace.	do.....	2	$\frac{1}{2}$	$\frac{1}{2}$		
Do.....	Top-carriage platform ladder.	do.....	2	1	$\frac{1}{2}$		
Do.....	Top-carriage hand rail.	do.....	2	1	2		
Do.....	Transom between chassis.	do.....	32	$\frac{1}{2}$	$\frac{3}{4}$		
Do.....	Chassis to traversing-wheel transom.	do.....	26	$\frac{1}{2}$	$\frac{3}{4}$	26	Fitted bolts.
Do.....	Traversing-circle joint plate.	do.....	24	$\frac{1}{2}$	$\frac{3}{4}$		
Do.....	Traversing-clamp bracket.	do.....	4	$\frac{1}{2}$	$\frac{1}{2}$		
Do.....	Traversing-clamp axle bolt.	Steel.....	2	2	10	2	
Do.....	Traversing-chain pulley bracket.	Wrought iron.	2	1	$\frac{1}{2}$		With washer and pin.
Do.....	Traversing-gear bracket.	do.....	4	$\frac{1}{2}$	$\frac{3}{4}$		
Bracket, crane.....	On crane.....	Cast iron	1				Two $\frac{1}{2}$ -inch dowel pins.
Bracket, elevating clamp.	Attached to left chassis.	do.....	1				
Bracket, piston.....	On left chassis.....	do.....	1				
Bracket, retraction sheaves.	On right chassis.....	Cast steel	1				Also for sight standard and piston.
Do.....	On left chassis.....	do.....	1				Also for crane.
Bracket, traversing clamp screw.	On traversing-gear bracket.	Cast iron	1				
Bracket, traversing gear.	On top of traversing-wheel transom.	Gun iron.....	1				With one $\frac{1}{2}$ -inch set screw.
Brackets, traversing chain pulley.	Under traversing-wheel transom.	Cast steel.....	2				With dowel pin.
Bushings.....	Chassis.....	Bronze.....	18				6 sizes.
Do.....	Elevating arm, lower end	do.....	2				
Do.....	Gun lever, upper end	do.....	2				In halves.
Do.....	Gun lever, lower end	do.....	2				
Do.....	Gun-lever axle-bed, top carriage.	do.....	2				Do.
Do.....	Recoil rollers.....	do.....	18				2 sizes.
Do.....	Retraction sheaves.....	do.....	14				
Do.....	Traversing-chain pulley.	do.....	2				
Do.....	Traversing-gear bracket.	do.....	2				Do.
Do.....	Sprocket wheel.....	do.....	1				
Buffers, recoil.....	On brackets on inside of chassis.	Rubber and iron.	2				Complete.
Buffer, recoil, brackets.	Attached to chassis.....	Cast steel.....	2				
Buffer, recoil, plates	Recoil buffer.....	Wrought iron.	6				
Buffer, recoil, caps.	do.....	do.....	2				
Buffer, recoil, cushions.	do.....	Rubber.....	8				
Buffer, recoil, cap bolts.	do.....	Steel.....	4				With 2 nuts and $\frac{1}{2}$ -inch dowel pin.
Buffer brackets.....	For elevating rack.....	Cast steel.....	2				Attached to rack guides.
Buffer bolts.....	Through brackets.....	Wrought iron.	2				With double nuts.
Buffer springs.....	Around buffer bolts.....	Spring steel.....	2				
Buffers, counter-recoil.	Rear stuffing-box head.	Bronze.....	2				
Chassis.....	Bolted to racer and traversing-wheel transom.	Cast steel.....	1				Right-hand.
Do.....	do.....	do.....	1				Left-hand.
Crosshead clips.....	On crosshead guides.....	do.....	2				Right and left.
Crosshead liners.....	In crosshead clips.....	Tobin bronze.	12				Narrow and wide.
Crosshead-liner rivets.	Through narrow liners.	Brass.....	24				$\frac{1}{2}$ -inch rivets.
Crosshead pawl hooks.	On hook fulcrum.....	Steel.....	2				
Crosshead pins.....	Through crosshead clips.	Forged steel.	2				1-inch pin.
Crosshead shaft.....	Crosshead.....	do.....	1				
Counterweights.....	Suspended from crosshead shaft.	Lead.....	11				Center plate.
Do.....	do.....	do.....	1				Top plates.
Do.....	do.....	Cast iron.....	1				Bottom plates.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Counterweights ...	Suspended from cross-head shaft.	Lead	88	In.	In.		Detachable pieces.
Counterweight handles.	In detachable pieces ...	Wrought iron.	78				Staple cast in pieces.
Counterweight hooks.	With carriage	Steel	2				For lifting counterweight.
Collars	Traversing-wheel axle	do	4				$\frac{1}{4}$ -inch split pin.
Do	Traversing-worm shaft..	Forged steel..	2				2 sizes, with $\frac{1}{4}$ -inch taper pin.
Do	Crane, crank shaft	Steel	1				$\frac{1}{4}$ -inch taper pin.
Collar couplings...	Retraction shaft	do	2				Two $\frac{1}{4}$ -inch taper pins in each.
Crane, frame	Attached to left chassis.	Wrought iron.	1				
Crane, drum	Drum shaft	Cast iron	1				$\frac{1}{4}$ -inch key and $\frac{1}{4}$ -inch screw.
Crane, drum shaft.	Crane bracket	Steel	1				
Crane, stop	Retraction-gear bracket.	Wrought iron.	1				
Crane, crank	Crane, crank shaft	Steel	2				
Crane, crank shaft.	Crane bracket	do	1				Pinion forged on end.
Crane, ratchet wheel.	Crane, crank shaft	do	1				$\frac{1}{4}$ -inch key.
Crane, pawl	Attached to crane bracket.	do	1				
Crane, pawl pin ...	In crane bracket	do	1				
Crane, pawl stop ..	do	do	1				
Crane, block	With crane	Bronze steel and wrought iron.	1				Complete.
Crane, sheaves	Attached to crane	Bronze	2				Direction sheaves.
Crane, sheave-stud axles.	Crane frame	Steel	2				With nut.
Crane, eyebolt	do	do	1				
Crane, spring stop.	On chassis	Wrought iron.	1				$1\frac{1}{2}$ by $1\frac{1}{2}$ by $\frac{1}{4}$ inch angle iron.
Crane rope	With crane	2-inch hemp ..	1				45 feet.
Crane-rope hook and thimble.	On crane rope	Galvanized iron.	1				
Crane spring	On crane	Spring steel ..	1				
Coupling, emptying.	Equalizing pipe	Bronze	1				
Coupling, followers.	Emptying coupling	do	2				
Coupling, plug	do	Wrought iron.	1				
Coupling, glands ..	do	Steel	2				
Coupling, straps ..	do	Wrought iron.	2				
Coupling, packings.	do	Leather	2				
Chain, traversing..	Around traversing circle.	Wrought iron.					55 feet $\frac{1}{4}$ -inch chain.
Chain, traversing, sprocket wheel.	Sprocket-wheel shaft....	Cast steel	1				
Chain, traversing, sprocket-wheel axle.	In worm box	Forged steel..	1				
Chain, traversing, pulleys.	Chain-pulley bracket....	Cast steel	2				Direction pulleys.
Chain, traversing, pulley axles.	do	Forged steel..	2				Dowel pin and $\frac{1}{4}$ -inch split pin.
Chain, traversing, screw bolt.	Adjusting screw for chain	Steel	1				With double nuts.
Chain, traversing, eyebolts.	Screwed to traversing circle.	do	2				2 kinds.
Chain, traversing, shackles.	On end of chain	Wrought iron.	4				$\frac{1}{4}$ -inch split pins for shackle pins.
Distance ring	Traversing-roller ring ..	do	1				Outer ring.
Do	do	do	1				Inner ring.
Do	For traversing-wheel roller bearings.	Bronze	8				
Dust guards	On traversing wheels....	Sheet steel....	8				In halves.
Do	For traversing wheels on transom.	do	8				Do.
Do	Around traversing rollers	Steel plate....	1				4 sections.
Dust guard, joint plates.	For traversing-roller dust guard.	do	4				Outer joint plate.
Do	do	do	16				Inner joint plate, riveted.
Direction plates ...	For elevating, on chassis.	Brass	2				Made right and left.
Do	For traversing, on chassis	do	2				Do.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Notes.	Remarks.
Elevating-arm boxes.	Elevating arm, gun end.	Bronze	2	In.	In.		In halves.
Elevating arms....	Joining elevating rack and gun.	Forged steel..	2				Right and left.
Elevating-arm caps.	On end of elevating arms.	.....do	2				Gun end.
Elevating-arm truss.	Between elevating arms.	Cast steel.....	1				
Elevating band....	On gun .....	.....do	1				Made right and left.
Elevating racks....	In guides on chassis.	.....do	2				Front guides, right and left.
Elevating-rack guides.	Bolted to chassis .....	.....do	2				Rear guides, right and left.
Do.....	.....do .....	.....do	2				
Elevating-rack stops.	Bolted to rack.....	Steel.....	2				
Elevating-rack stop plates.	Bolted to guides.....	Wrought iron..	2				
Elevating-rack pinion shaft.	Through chassis.....	Forged steel..	2				
Elevating-rack liners.	Screwed to racks.....	Bronze	4				
Elevation pointer.	On left chassis.....	Sheet brass....	1				
Elevation circles..	On elevating spur wheel.	Brass	2				Graduated.
Elevating hand wheel.	With clamp pulley, for left side.	Cast and wrought iron.	1				Complete, with $\frac{1}{8}$ -inch key.
Do.....	Without clamp pulley, for right side.	.....do	1				Do.
Elevating-hand-wheel shaft.	Through chassis.....	Forged steel..	1				2 nuts and 2 washers.
Elevating-clamp band.	Around clamp pulley ..	Wrought iron..	1				In two parts.
Elevating-clamp pin.	Driven in left chassis....	Steel.....	1				With nut and washer.
Elevating-clamp stud axle.	Driven in clamp bracket .....	.....do	1				Do.
Elevating-clamp cam.	On clamp lever.....	Forged steel..	1				One $\frac{1}{2}$ by $\frac{1}{4}$ inch key.
Elevating-clamp lever.	On clamp-stud axle .....	.....do	1				
Elevating-clamp spring.	Around clamp bolt.....	Steel wire	1				
Gun lever.....	Carrying gun.....	Cast steel.....	2				One 2-inch key.
Gun-lever axle....	Gun lever	Forged steel..	1				
Gun-lever caps....	Gun end of lever .....	.....do	2				
Gun-lever handle..	On right gun lever	Wrought iron..	1				
Gun-lever clevises.	On gun lever, gun end .....	.....do	2				For retraction.
Gun-lever clevis pins.	For clevis .....	.....do	2				$\frac{1}{4}$ split pin.
Gear, crane.....	On crane-drum shaft....	Bronze	1				96 teeth; $\frac{1}{4}$ -inch key, $\frac{1}{4}$ -inch headless screw.
Gears, spur, elevating.	On elevating-rack pinion shaft.	Cast steel.....	2				77 teeth; two 1-inch keys.
Gears, pinions, elevating.	On elevating-hand-wheel shaft.	Bronze	2				14 teeth; one $\frac{1}{8}$ -inch key.
Do.....	Engaging elevating racks.	.....do	2				16 teeth; two 1-inch keys.
Gears, with drums, retraction.	On worm shaft.....	.....do	2				60 teeth; 1 bored $2\frac{1}{4}$ inches; 1 bored $2\frac{1}{2}$ inches.
Hookfulcrum bolts.	Sides of chassis.....	Steel.....	2			2	
Hook operating cable.	On crosshead .....	.....do	2				
Implement box ..	With carriage	Ash.....	1				With lock and handles.
Keys	For chassis to racer.....	Steel.....	2				2 by 1 inch.
Ladder	To sight-standard platform.	Wrought iron..	1				Lower, 9 inches wide.
Do.....	.....do .....	.....do	1				Upper, 16 inches wide.
Do.....	To top-carriage platform.	.....do	1				
Ladder brace.....	To sight-standard platform.	.....do	1				
Platform, top carriage.	On right recoil cylinder.	Rolled iron....	1				
Platform, sight standard.	In rear on right chassis.	.....do	1				

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Platform, brace ...	For top-carriage platform.	Wrought iron.	1	In.	In.		
Do.....	For sight-standard platform.	do.	1				
Platform, hand rail	Top-carriage platform.	do.	1				With 4 nuts.
Do.....	Attached to top carriage.	do.	1				
Do.....	On sight-standard platform.	do.	1				1-inch pipe, elbows and nuts.
Platform, screen frame.	Sight-standard platform.	do.	1				1-inch pipe with elbows.
Platform, screen...	Attached to frame.	Wire netting.	1				
Name plate.....	On right chassis.	Bronze.	1				
Oil plugs.....	In carriage.	do.	1				1/2-inch tap.
Do.....	do.	do.	1				1/2-inch tap.
Oil can.....	With carriage.	Brass.	1				Capacity, 1 quart.
Do.....	do.	do.	2				Capacity, 1/2 pint.
Pawls, stationary..	On fulcrum pin.	Forged steel.	2				Made right and left.
Pawls, hook pin...	On stationary pawl.	do.	2				
Pawls, movable...	On pawl crank.	do.	2				Do.
Pawls, spring.....	On chassis.	Spring steel.	4				
Pawls, movable crank.	Attached to movable pawl.	Forged steel.	2				Do.
Pawl stops.....	Attached to chassis.	do.	2				With nut.
Pawl, fulcrum pins	For crank pawl.	do.	2				
Do.....	For stationary pawl.	do.	2				
Pawl, crank keys..	In pawl lever.	do.	4				1/2 by 1/2 inch.
Pawl, levers.....	Movable pawl crankshaft.	do.	2				Made right and left.
Do.....	do.	do.	2				Straight lever.
Pawl, lever hooks..	Sides of chassis.	Steel.	4				
Pins, fulcrum.....	For pinching bar on chassis.	do.	6				1 tapped to receive stop.
Pins, dowel.....	For stiffening bar, top carriage.	Wrought iron.	4				With head.
Piston and rods...	In recoil cylinders.	Forged steel.	2				With 2 nuts each.
Piston liners.....	Pistons.	Bronze.	8				Fastened with 22 steel pins.
Pipe, equalizing...	Between recoil cylinders.	Copper.	1				2 parts.
Pipe, equalizing, straps.	Over equalizing pipe.	Wrought iron.	2				
Pipe, equalizing, glands.	At ends of equalizing pipe.	Steel.	2				
Pipe, equalizing, followers.	do.	Bronze.	2				
Pipe, equalizing, packings.	do.	Leather.	2				
Pipe, emptying...	Traversing gear bracket.	Brass.	1				With cap nut.
Pipe, oil.....	Sprocket-wheel shaft.	do.	1				Do.
Plugs, filling.....	Top of recoil cylinder.	Bronze.	6				
Racer.....	On traversing rollers.	Cast steel.	1				
Racer clip.....	On racer.	Forged steel.	1				
Rollers, traversing.	On base ring.	do.	20				
Rollers, bearing...	For traversing wheels.	Cold rolled steel.	72				
Rollers, recoil.....	In top of chassis.	Forged steel.	2				
Do.....	do.	do.	16				
Roller axles, recoil.	do.	do.	16				Diameter, 2 1/2 in.
Do.....	do.	do.	2				Diameter, 2 1/2 in.
Ropes, retraction..	Retraction mechanism.	3-inch manila rope.	2				115 feet.
Rope, retraction, hooks and eyes.	Retraction rope.	Galvanized iron.	2				
Retraction gear shaft.	Through chassis.	Steel.	2				Pinion forged on end.
Do.....	Between chassis.	do.	1				Center part.
Retraction sheaves	On gun levers and brackets.	Cast iron.	14				
Retraction-sheave axles.	Retraction-sheave bracket.	Forged steel.	4				Washer and 1/2-inch split pin.
Ratchet wheels...	Retraction shaft.	Steel.	2				With 1/2-inch key.
Ratchet pawls....	Attached to chassis.	do.	2				
Ratchet-pawl stud axles.	In chassis.	do.	2				
Studs.....	Caps on gun lever.	Wrought iron.	4	2	8 1/2	8	4 nuts 2 inches high, 4 nuts 1 inch high.
Do.....	Recoil cylinder heads.	do.	32	1 1/2	4 1/2	32	
Do.....	Top-carriage caps.	do.	4	2 1/2	9 1/2	4	
Do.....	Elevating-arm caps.	do.	4	1 1/2	5 1/2	8	

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number	Diameter.	Length.	Sub.	Remarks.
				In.	In.		
Screws.....	Dust guards for traversing wheels.	Wrought iron.	224	1/4	1/2		Round head.
Do.....	Direction plates.....	Brass	12	1/4	5		Do.
Do.....	Stiffening bar for top carriage.	Wrought iron.	4	1 1/4	5		Round slotted head.
Do.....	Throttling bar, through stiffening bar.	do	2	1	3 1/2		For bar A. Round slotted head.
Do.....	do	do	2	1	3 1/2		For bar B. Round slotted head, with lead washer.
Do.....	do	do	2	1	3 1/2		For bar B. Round slotted head, with lead washer.
Do.....	do	do	2	1	2 1/4		Round slotted head.
Do.....	For elevating-rack stop.	do	2	1 1/4	1 1/2		Do.
Do.....	do	do	2	1	2 1/4		Do.
Do.....	do	do	2	1	4 1/2		Do.
Do.....	Sight-standard set screws	Brass	2	1/8	1 1/2		Wing bolt.
Do.....	Pointers, elevation and traversing.	Brass	4	1/8	1 1/2		Round head.
Do.....	Name plate.....	do	2	1/4	1 1/2		Do.
Screws, countersunk.	Gun-lever axle-bed bushing.	do	16	1/4	1 1/2		
Do.....	Trunnion-bed bushing	do	16	1/4	1 1/2		
Do.....	Liners for crosshead clip	do	8	1/4	1 1/2		
Do.....	do	do	8	1/4	1 1/2		
Do.....	do	do	24	1/4	1 1/2		
Do.....	Top carriage, liners.	do	40	1/4	1 1/2		
Do.....	do	Wrought iron.	20	1/4	2 1/2		
Do.....	Elevating rack, liners.	do	44	1/4	1 1/2		
Do.....	Top-carriage platform.	do	2	1/4	2	2	
Do.....	Elevation circle on elevating gear.	Brass					
Do.....	Sight-standard platform ladder.	Wrought iron.	2	1/4	1 1/2		To chassis.
Stop.....	Left chassis, for elevating clamp handle.	Steel	1				
Step.....	On top carriage, to platform.	do	1				
Do.....	On chassis, to top-carriage platform.	Wrought iron.	1				1-inch bar, with 2 nuts.
Stuffing-box heads.	Rear ends of cylinders.	Cast steel	2				
Stuffing-box bushings.	Front ends of cylinders.	Brass	2				
Stuffing-box glands.	Rear stuffing boxes.	do	2				
Do.....	Front stuffing boxes.	do	2				
Stuffing-box followers.	Rear stuffing boxes.	do	2				
Do.....	Front stuffing boxes.	do	2				
Stuffing-box gland extractors.	With carriage.	Steel	2				
Shot tray.....	do	Wrought iron.	1				With hanger and shot stop.
Sight standard.....	Rear end of right chassis.	Cast steel	1				
Sight caps.....	On sight standard	Cast iron	2				
Stiffening rib A.....	On top carriage.	Gun iron	1				On Bethlehem Iron Co. No. 1; Wm. Cramp & Sons Nos 1 and 2.
Stiffening rib B.....	do	do	1				On Watertown Arsenal Nos. 1, 2, and 3; Bethlehem Iron Co. Nos. 2, 3, and 4; Pond Machine Co. Nos. 1, 2, 3, 4, 5, 6, 7, and 8; Kilby Manufacturing Co. Nos. 1, 2, and 3.
Suspension rods.....	Through counterweight.	Forged steel.	2				With 2 nuts each.
Top carriage.....	On recoil rollers.	Gun iron	1				
Top-carriage caps.	On top carriage	Cast steel	2				
Top-carriage liners.	Top carriage	Brass	6				
Traversing wheels.	On traversing circle.	Cast steel	4				
Traversing-wheel axles.	Traversing-wheel transom.	Forged steel.	4				1/4-inch dowel pin.
Traversing circle.	On platform.	Gun iron	1				In 4 segments.
Traversing-circle joint plates.	For joining segments	Steel	3				

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Traversing-wheel transom.	Bolted to chassis	Cast steel.....	1	In.	In.		
Traversing-clamp jaws.	Attached to traversing-wheel transom.	.....do.....	2				Front and rear.
Traversing-clamp screw.	Through jaws	Steel	1				Right and left hand threads.
Traversing-clamp crank.	On clamp screw	Wrought iron.	1				Brass sleeve.
Traversing-clamp swiveling nuts.	In clamp jaw	Bronze	1				Left-hand threads.
Do.....	.....do.....	.....do.....	1				Right-hand threads.
Traversing-worm wheel.	Engaging traversing worm.	Cast steel.....	1				42 teeth; one $\frac{1}{8}$ by $\frac{1}{16}$ inch key.
Traversing worm.	In worm box	Bronze	1				One $\frac{1}{8}$ by $\frac{1}{16}$ inch key.
Traversing-worm shaft.	Through chassis and worm box.	Forged steel..	1				
Traversing-wheel stops.	At ends of traversing circle.	Steel	2				
Traversing cranks.	On traversing-worm shaft.	Forged steel..	2				With brass sleeves.
Transom	Between chassis	Cast steel.....	1				Front transom.
Do.....	.....do.....	.....do.....	1				Rear transom.
Tripping bars.....	With carriage	Steel	2				Stop riveted on bar.
Tripping-bar fulcrums.	Attached in front to chassis.	.....do.....	2				
Tripping-bar hooks.	Sides of chassis .....	.....do.....	4				
Throttling bars.....	In recoil cylinders	Forged steel..	4				
Wrench	Spanner wrench, stuffing-box follower.	Steel.....	1				Rear end of cylinder.
Do.....	.....do.....	.....do.....	1				Front end of cylinder.
Do.....	Spanner wrench, stuffing-box bushing.	.....do.....	1				Do.
Do.....	For cylinder-head nuts.....	.....do.....	1				
Do.....	For piston-rod nuts.....	.....do.....	2				
Do.....	For suspension-rod nuts.....	.....do.....	2				
Do.....	For $\frac{1}{2}$ and $\frac{1}{4}$ inch nuts.....	.....do.....	1				
Do.....	For $\frac{1}{2}$ and $\frac{1}{4}$ inch nuts.....	.....do.....	1				
Do.....	For $\frac{1}{2}$ and $\frac{1}{4}$ inch nuts.....	.....do.....	1				
Do.....	For $\frac{1}{2}$ and $\frac{1}{4}$ inch nuts.....	.....do.....	1				
Do.....	For $\frac{1}{2}$ and $\frac{1}{4}$ inch nuts.....	.....do.....	1				
Do.....	For 2 and $2\frac{1}{2}$ inch nuts.....	.....do.....	1				
Do.....	For $2\frac{1}{2}$ inch nuts.....	.....do.....	1				

10-INCH DISAPPEARING CARRIAGE, L. F. MODEL 1896.

(Price of carriage, \$15,499.57.)

Weight of principal parts.

Name.	Weight.
	<i>Pounds.</i>
Chassis, top carriage, piston rods, trunnions, and assembled gearing.....	41,196
Base ring (in sections).....	24,232
Racer (in sections).....	15,794
Mistance rings.....	1,484
Three shot trucks	2,553
Elevating arms.....	1,634
Gun levers, with axles, crosshead and suspension rods.....	15,730
Elevating band.....	824
Bottom plate for counterweight for carriages after No. 30.....	5,670
Bottom plate for counterweight for carriages Nos. 1-30.....	2,046
Lead counterweight.....	77,638
Total weight of carriage, including counterweight.....	198,000

List of the parts of carriage, location, material, correct nomenclature, etc.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inch.	Inch.		
Armament chest	With carriage		1				With lock.
Azimuth circle	On base ring	Brass	1				In 6 sections.
Azimuth circle, dust guard.	On racer	do	1				
Azimuth pointer	do	do	1				For carriages Nos. 1 to 70, inclusive, with 2 dowel pins $\frac{1}{4}$ inch in diameter.
Do	do	Bronze	1				For carriages after No. 70, with 2 dowel pins $\frac{1}{4}$ inch in diameter.
Azimuth-pointer index.	On azimuth-pointer slide	do	1				Blackened.
Azimuth-pointer screw.	Between pointer and slide.	do	1				With 2 steel taper pins.
Azimuth-pointer slide.	Azimuth pointer	do	1				
Azimuth-pointer thimbles.	On azimuth-pointer screw.	do	2				
Ball-bearing washers.	Elevating-worm shaft	Hardened steel	2				Top and bottom parts.
Ball-bearing balls.	Between washers	do	20				
Ball-bearing cover.	Over ball-bearing washer	Bronze	1				
Base ring	On platform	Gun iron	1				In halves.
Base-ring slide	Base ring	Cast iron	1				
Base-ring slide liners.	For base-ring slide	Bronze	6				With rivets.
Base-ring slide screw.	Base-ring slide	do	1			1	With 1 steel taper pin.
Base-ring slide-screw nut.	On base-ring slide screw.	do				1	8 threads per inch.
Bolts (hexagonal head).	Base-ring joint	Wrought iron.	16	1.5	7.75	16	
Do	Chassis to racer	do	46	1.5	4		For carriages Nos. 1 to 22.
Do	do	do	42	1.5	4		For carriages after No. 22.
Do	Chassis ladder	do	4	1	2		
Do	Collar for handwheel shaft.	do	1	.5	1		Set screw.
Do	Crosshead pawl spring	do	4	.5	1		
Do	Crosshead pawl-spring bracket.	do	4	.75	1.75		
Do	Distance rings	do	30	.75	2.25		
Do	Distance rings and separators.	do	15	1	14.6	15	Special.
Do	Drum casing (right)	do	4	.75	3	4	For carriages Nos. 1 to 70, inclusive.
Do	Drum casing (left)	do	4	.75	1.8		Do.
Do	Drum casing (right)	do	4	.75	3.25	4	For carriages after No. 70.
Do	Drum casing (left)	do	4	.75	1.75		Do.
Do	Dust guard to racer	do	60	.5	1		
Do	Dust-guard joint	do	48	.5	.625		
Do	Elevating-arm truss	do	6	1.5	4.75		
Do	Elevating-arm truss, lower end.	do	2	1.5	6		
Do	Elevating-band set screw	Hardened steel	2	1.5			Special bolt.
Do	Elevating-band clamp bolt.	Wrought iron.	2	2		2	
Do	Elevating-rack buffer	do	2	1		4	Special.
Do	Elevating-rack guide	do	24	1.25			Do.
Do	Elevating-rack stop	do	2	1.75			Do.
Do	Emptying-coupling plug	Steel	1				Do.
Do	Emptying coupling	Wrought iron.	2	.75	1.75		
Do	Equalizing-pipe straps.	do	3	.5	.75		
Do	Floor plate	do	10	1	2		
Do	Leveling screws	Bronze	16	2.0	3.75		
Do	Gun-lever handle.	Wrought iron.	2	.75	1.5		
Do	Piston-rod bracket	do	2	1.25	8.5		
Do	Racer clip to racer	do	6	1.5	4		
Do	Racer joint	do	14	1.5	7.75	14	
Do	Recoil-buffer bracket	do	8	1.5	10.75	8	
Do	do	do	4	2	14	4	Special nuts.
Do	Retraction-drum shaft collar.	Steel	1	.75	1.75		Set screw.
Do	Retraction-shaft bracket	Wrought iron.	4	1.25	3.25		

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Bolts (hexagonal head).	Retraction-shaft end bearing.	Wrought iron.	4	<i>Ins.</i> 1.25	<i>Ins.</i> 3.25	...	
Do.....	Retraction-rope pulley bracket.	do	14	1.25	3.5	...	
Do.....	Retraction-rope guard.	do	4	.5	.75	...	
Do.....	Retraction-rope fastener.	do	2	.75	2	...	
Do.....	do	do	2	.75	1.8	...	
Do.....	Sight-standard ladder braces.	do	2	1	4.1	2	Special.
Do.....	Sight-standard platform brace.	do	2	1	2	...	
Do.....	Sight-standard cap.	do	8	.5	1.5	...	
Do.....	Suspension-rod nut.	do	8	.75	4	...	
Do.....	Throttling bars.	do	20	1	3.85	...	Special bolts with lead packing.
Do.....	do	do	20	1	3.45	...	Special bolts with lead packing for carriages Nos. 1 to 70, inclusive.
Do.....	do	do	18	1	3.85	...	Do.
Do.....	do	do	18	1	3.45	...	Special bolts with lead packing for carriages after No. 70.
Do.....	Throttling valve.	do	2	.75	1.75	...	Do.
Do.....	Top-carriage platform ladder brace.	do	4	.75	1.5	...	
Do.....	Transoms between chassis.	do	32	1.25	3.25	...	
Do.....	Traversing-crank-shaft bracket.	do	2	1	2.75	...	
Do.....	Traversing-crank-shaft collar.	do	1	.5	1.25	...	Set screw.
Do.....	Traversing-gear bracket.	do	5	1	...	...
Do.....	Thrust-collar set screw.	Steel	1	.75	1.5	...	Special screw.
Do.....	Traversing-gear guard.	Wrought iron.	3	3.75	.75	...	
Do.....	Tripping lever.	Steel	2	.5	.75	...	Set screw.
Do.....	Tripping-lever rest.	Wrought iron.	4	.75	1	...	
Do.....	Worm-shaft bracket.	do	2	.75	2.75	...	
Do.....	Worm-wheel casing.	do	2	1.25	4.5	...	
Do.....	do	do	4	1.25	3.25	...	
Bracket, elevating-worm shaft.	On rear transom.	Cast iron	1	...	...	...
Bracket, elevating-hand wheel shaft.	do	do	1	...	...	...
Bracket, piston rod.	On left chassis.	Cast steel	1	...	...	...
Do.....	On right chassis.	do	1	...	...	...
Bracket, retraction-rope pulley.	do	do	1	...	...	...
Do.....	On left chassis.	do	1	...	...	...
Bracket, retraction-drum shaft.	Inside of right chassis.	do	1	...	...	...
Bracket, end bearing.	Retraction-drum shaft.	do	1	...	...	...
Bracket, traversing gear.	On racer.	Cast iron	1	...	...	...
Bracket, traversing-crank shaft.	On left chassis.	do	1	...	...	...
Bracket strips.	On retraction-rope pulley bracket.	Wrought iron.	2	...	...	...
Brackets, tripping shaft.	Front of chassis.	Cast iron	2	...	...	...
Buffers, recoil.	On bracket on inside of chassis.	Rubber and iron.	2	...	...	...	Complete.
Buffer, recoil brackets.	Attached to chassis.	Cast steel	2	...	...	...	Right and left.
Buffer, recoil plates.	Recoil buffer.	Wrought iron.	10	...	...	...
Buffer, recoil, caps.	do	do	2	...	...	...
Buffer, recoil, cushions.	do	Balata.	12	...	...	...
Buffer, recoil, cap bolts.	do	Steel	4	1	12	4	0.25-inch dowel pin.
Buffer, eyebolt brackets.	For elevating rack.	Wrought iron.	2	...	...	2	0.5-inch dowel pins and 2 steel washers.
Buffer bolts.	Through eyebolt bracket.	do	2	...	...	4	
Buffer springs.	Around buffer bolts.	Spring steel	2	...	...	...

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Weight.	Remarks.
				Inch.	Inch.		
Buffers, counter recoil.	Rear stuffing-box head..	Bronze	2				
Bushings	Chassis	do	10				Nine sizes.
Do	Elevating arm, lower end.	do	2				
Do	Gun lever, lower end.	do	2				In halves.
Do	Gun lever, upper end.	do	2				Do.
Do	Gun lever, axle bed, top carriage.	do	2				
Do	Handwheel shaft bracket.	do	1				
Do	Recoil-roller frame.	do	66				Three sizes.
Do	Traversing-gear bracket.	do	3				
Do	Traversing-crank-shaft bracket.	do	1				
Do	Worm-shaft bracket.	do	1				Two sizes.
Do	Worm-wheel casing.	do	2				
Do	Base-ring slide.	do	1				
Do	Pawl.	do	2				
Do	Pawl lever.	do	2				
Do	Retraction-rope pulley.	Steel	2				
Do	Tripping-shaft bracket.	Bronze	1				
Chassis	Bolted to racer	Cast iron	1				Right hand, for carriages Nos. 1 to 22, inclusive, 24, Nos. 23 to 70, 1st after 70, 1st 20, inclusive.
Do	do	do	1				Left hand, for carriages Nos. 1 to 22, inclusive, 24, Nos. 23 to 70, 1st after 70, 1st 20, inclusive.
Collar	Elevating-handwheel shaft.	Steel	1				
Do	Retraction-drum shaft.	do	1				
Do	Traversing-crank shaft.	do	1				
Do	Worm-wheel shaft thrust collar.	do	1				
Collar coupling	Retraction-crank shaft.	do	1				One 0.5-inch square key, two 0.5-inch steel pins.
Counterweight, center plates.	Suspended from cross-head shaft.	Lead	10				Carriages Nos. 1 to 30.
Counterweight, top plate.	do	do	1				Do.
Counterweight, bottom plate.	do	Cast iron	1				Do.
Counterweight, detachable pieces.	do	Lead	86				Do.
Counterweight, handles.	In detachable pieces.	Wrought iron.	70				Do.
Counterweight, center plates.	Suspended from cross-head.	Lead	8				Carriages after No. 30.
Counterweight, top plates.	do	do	9				Do.
Counterweight, bottom plate.	do	Cast iron and lead.	1				Do.
Counterweight, detachable pieces.	do	Lead	63				Do.
Counterweight, handles.	In detachable pieces.	Wrought iron.	68				Do.
Counterweight hooks.	With carriage	Steel	2				For lifting counterweight.
Coupling, emptying.	Equalizing pipe.	Bronze	1				
Coupling, followers.	do	do	3				
Coupling, plug.	do	Steel	1				
Coupling, glands.	do	do	3				
Coupling, packings.	do	Flexible vulcanized fiber.	8				
Cover	On base ring.	Steel plate	1				
Crosshead	Between chassis.	Cast steel	1				Carriages after No. 30.
Crosshead clips, right and left.	On crosshead guides.	do	2				Carriages Nos. 1 to 30.
Crosshead-clip liners.	In crosshead clips.	Tobin bronze.	12				Do.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Crosshead-clipper rivets.	Through narrow liners..	Brass	24	Ins. 0.875	Ins.		Carriages Nos. 1 to 30.
Crosshead liners...	In crosshead.....	Tobin bronze.	16				Carriages after No. 30.
Crosshead-liner rivets.	Through narrow liners..	Brass	26	.375			Do.
Direction plates...	For elevating, on chassis.	Bronze	2				Right and left.
Do.....	For depressing, on chassis	do	2				Do.
Do.....	For retraction, on chassis	do	2				Do.
Do.....	For traversing, on traversing-gear bracket.	do	2				Do.
Distance ring.....	Traversing-roller inner ring.	Wrought iron.	1				In 3 segments.
Do.....	Traversing-roller outer ring.	do	1				Do.
Dust guard.....	Roller bearing for retraction-drum shaft.	Steel.....	1				Two washers, bored 3.06 inches.
Do.....	do	do	1				Two washers, bored 2.8 inches.
Do.....	For traversing roller, on racer.	Steel plate...	1				In 6 sections.
Dust-guard joint plates.	For traversing-roller dust guard.	do	18				Three sizes.
Dust-guard washers.	In roller-bearing dust guard.	Felt	2				
Elevating arms...	Joining elevating rack and gun.	Forged steel..	2				Right and left.
Elevating-arm boxes.	Elevating arm, gun end.	Bronze	2				In halves.
Elevating-arm caps.	On end of elevating arms.	Forged steel..	2				Gun end.
Elevating-arm truss.	Between elevating arms.	Cast steel....	1				Upper or gun end.
Do.....	do	do	1				Lower or rack end.
Elevating band...	On gun	do	1				
Elevation disks...	On worm-wheel shaft...	Cast iron	2				0.5-inch key and 0.5-inch headless screw.
Elevation-disk bands.	On elevating disk	Brass	2				Graduated.
Elevation pointers.	On chassis.....	Sheet brass...	2				Two 0.25-inch dowel pins.
Elevating racks...	In guides on chassis.....	Cast steel....	2				1.5-inch P. made right and left.
Elevating-rack guides.	Bolted to chassis	Bronze	2				
Elevating bevel gear.	Elevating-handwheel shaft.	Steel.....	1				17 teeth, 3 P., 0.5-inch key.
Do.....	Elevating worm shaft...	do	1				21 teeth, 3 P., 0.5-inch key.
Elevating pinions.	Engaging elevating rack	Bronze	2				24 teeth, 1.5-inch P., two 0.75-inch keys. On right side 3-inch bore. On left side 3.6-inch bore.
Elevating worm...	Turned on shaft.....	Forged steel..	1				
Elevating-worm wheel.	On worm-wheel shaft...	Bronze	1				27 teeth, 1.5 P.
Elevating hand-wheels.	Elevating-handwheel shaft.	Cast and wrought iron	2				0.5-inch key and 0.5-inch headless screw.
Elevating-hand-wheel shaft.	Through chassis.....	Forged steel..	1				
Elevating-worm-wheel shaft.	do	do	1			2	With adjusting nuts.
Elevating-worm-wheel casing.	On racer.....	Cast iron	1				Two halves.
Elevating-worm-wheel casing covering.	On worm-wheel casing..	Sheet steel....	1				Do.
Extractor.....	For removing gun-lever pin.	Steel.....	1				For carriages after No. 30.
Do.....	For cylinder head.....	do	1				
Floor plates.....	On racer.....	Wrought iron.	2				Made right and left.
Friction clamp....	On worm-wheel shaft...	Cast steel....	1				Two 0.75-inch keys.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Gun levers	Carrying gun	Cast steel	2	In.	In.		2 by 1.8-inch key.
Gun-lever axle	Gun lever	Forged steel	1				
Gun-lever caps	Gun end of lever	do	2				
Gun-lever handle	On right gun lever	Wrought iron	1				
Gun-lever eyebolts	In gun-lever caps	do	2				
Gun-lever hooks	In gun end of lever	do	2				
Gun-lever pins	In crosshead	Forged steel	2				Carriages after No. 30, 0.75-inch headless screws.
Keys	In base ring	do	2				1 by 2 inch key.
Do	In racer	do	2				Do.
Do	For chassis to racer	do	4				Do.
Ladder	To sight-standard platform	Wrought iron	1				
Do	On outside of left chassis	do	1				
Do	To top-carriage platform	do	1				
Ladder brace	Sight-standard ladder	do					Different kinds of braces for different kinds of carriages.
Do	For chassis ladder	do	2				Each is bent differently.
Do	For top-carriage ladder	do	2				Made right and left.
Latch springs	Latch to chassis	Spring steel	2				
Name plate	On right chassis	Bronze	1				0.625-inch tap.
Oil plugs	In carriages	Brass					0.875-inch tap.
Do	do	do					Capacity, 1 quart.
Oil can	With carriages	do	1				Capacity, 1 pint.
Do	do	do	2				Yale standard padlock No. 858.
Padlock	Throttling valve	Bronze	1				Right and left.
Pawls	For crosshead on fulcrum pin	Forged steel	2				
Pawl, fulcrum pins	In chassis for crosshead pawl	do	2				
Pawl latch dog	Crosshead	Steel	1				
Pawl latch stud	For latch on chassis	do	1			2	With 2 bronze washers.
Pawl latch-spring pins	For latch spring	do	2				
Pawl levers	On pawl fulcrum	Forged steel	2				Right and left, with steel pin.
Pawl-lever cranks	On tripping shaft	Steel	2				
Pawl-lever links	Pawl-lever crank	do	2				
Pawl pins	For lever and link	Bronze	4				
Pawl safety latch	On latch stud	Steel	1				
Pawl springs	Pawl to lever	Spring steel	2				
Pawl springs, flat	On chassis	do	2				
Pawl-spring brackets	do	Wrought iron	2				
Pawl stops	In chassis	Forged steel	2				
Pawl washers	Between pawl and lever	Bronze	6				Two 0.12 inch thick, four 0.06 inch thick.
Pipe, equalizing	Between recoil cylinders	Copper	1				Five pieces.
Pinch bars	With carriage	Steel	2				
Pinch-bar hooks	On sides of chassis	Wrought iron	4				
Pipe, straps	Over equalizing pipe	do	2				
Pipe, glands	At ends of equalizing pipe	Steel	4				
Pipe, followers	do	Bronze	4				
Pipe, packings	do	Flexible vulcanized fiber	4				
Piston and rods	In recoil cylinders	Forged steel	2			4	
Piston liners	Pistons	Bronze	8				Fastened with 0.25-inch steel pins.
Platform, sight standard	In rear on right chassis	Rolled iron	1				
Platform, top carriage	On right recoil cylinder	do	1				
Platform brace	For sight-standard platform	Wrought iron	1				
Do	For top-carriage platform	do	1				
Platform, hand rail	Top-carriage platform	do	1			4	0.75-inch nuts.
Do	On sight-standard platform	do	1			8	1-inch pipe elbows and nuts with pipe threads.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Notes.	Remarks.
Platform, screen...	Attached to frame.....	Wire netting.	1	Inch.	Inch.		
Platform, screen frame.	Sight-standard platform.	Wrought iron.	1				0.75-inch pipe with elbows.
Plugs, filling.....	Tops of recoil cylinders.	Bronze	12				Six of them to be in reserve.
Racer	On traversing rollers....	Cast steel.	1				Cast in halves.
Racer clips	On racer.....	Cast steel, No. 1.	2				
Ratchet wheel.....	On retraction crank shaft.	Steel.....	1				0.5-inch square key.
Ratchet pawl.....	On pawl pin attached to chassis.	do	1				
Ratchet-pawl pin..	In chassis.....	do	1				
Retraction pinion..	On outside of chassis....	do	1				Cut on shaft 12 teeth, 3 P.
Do.....	On inside of chassis....	do	1				Cut on shaft 12 teeth, 2 P.
Retraction gear.....	do	Cast steel	1				0.5-inch key and 0.5-inch headless screw, 54 teeth, 4 P.
Do.....	On outside of chassis....	do	1				With handle, 0.5-inch key and 0.5-inch headless screw, 57 teeth, 3 P.
Do.....	On retraction drum shaft	do	1				Two 0.65-inch keys, 44 teeth, 2 P.
Retraction gear handle.	On outside retraction gear.	Steel.....	1				
Retraction drum shaft.	In chassis and bearing..	Forged steel..	1				With 0.65-inch square keys.
Retraction crank shaft.	In chassis	do	1				
Retraction crank-shaft pinion.	Forged on crank shaft ..	do	1				16 teeth, 4 P.
Rollers, recoil	On top of chassis	do	28				
Rollers, traversing.	On base ring	do	30				
Roller-frame side pieces.	Taking recoil rollers ..	do	4				
Roller-frame stays.	In recoil-roller frame....	Steel.....	28				
Roller-frame end pieces.	At ends of recoil frame....	do	4				
Roller-frame pins..	Through end pieces	do	4				
Rollers, bearing ..	In retraction drum-shaft bracket and chassis.	do	2				
Do.....	In retraction drum-shaft and bearing.	do	1				
Do.....	In racer for traversing shaft.	do	1				
Do.....	In traversing-gear bracket.	do	1				
Do.....	In retraction-rope pulley	do	2				
Rope drum	Retraction drum shaft ..	Cast iron	1				Right-hand.
Do.....	do	do	1				Left-hand.
Rope-drum casing.	Retraction-shaft bracket	do	1				Right.
Do.....	Inside of left chassis ..	do	1				Left.
Rope fasteners.....	Retraction drum	Steel.....	2				
Rope guards.....	From recoil buffer to drum.	Sheet steel..	2				
Ropes, retraction..	From gun lever to rope drum.	Steel wire ..	2				With loop.
Rope, retraction, pulleys.	In rope-pulley brackets.	Cast iron	2				
Rope, pulley, axles	do	Forged steel..	2				Washer and 0.5-inch split pin.
Screw-drivers	With carriage	Steel.....	2				One with wood handle.
Screws, cheese-head.	Training rack to base ring.	Wrought iron.	72	0.625	1.9		
Do.....	Roller-bearing dust guard.	do	6	.375	1.25		
Do.....	Elevating-rack stop	Steel.....	2	1.75	2		Special.
Do.....	Elevating-rack guide....	do	24	1.25	3.25		
Do.....	Sight standard	do	2	1			
Screws, counter-sunk.	Azimuth circle.....	Brass.....	72	.25	.5		
Do.....	Azimuth-circle dust guard.	do	6	.25	.5		

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inch.	Inch.		
Screws, counter-sunk.	Base-ring slide liners.	Brass	8	0.375	0.75		
Do.	Crosshead liners.	do	8	.625	1.75		Carriages after No. 30.
Do.	Crosshead-clip liners.	do	8	.625	1.25		Carriages Nos. 1 to 30.
Do.	Crosshead liners.	do	4	.625	3		Carriages after No. 30.
Do.	Crosshead-clip liners.	do	24	.625	1		Carriages Nos. 1 to 30.
Do.	Crosshead liners.	do	28	.625	1.25		Carriages after No. 30.
Do.	Elevation graduation strip.	do	22	.25	.5		
Do.	Gun-lever trunnion liner.	do	16	.75	1.5		
Do.	Handwheel-shaft bracket.	Wrought iron	2	.75	2.5		
Do.	Pawl latch dog.	Brass	1	.5	1.5		
Do.	Roller-bearing dust guard.	do	6	.25	.625		
Do.	Retraction-rope guard.	Wrought iron	4	.5	.75		
Do.	Racer (oil holes).	Brass	8	.625	1		
Do.	Strips under retraction-rope pulley bracket.	Wrought iron	4	.5	.75		
Do.	Sight standard ladder screen.	do	8	.375	.375		
Do.	Strips under piston-rod bracket.	do	4	.5	.75		
Do.	Step to racer.	do	4	.75	1.25		
Do.	Top-carriage liners.	Brass	40	.375	.75		
Do.	do	do	6	.375	2.75		
Do.	Top-carriage ladder.	Wrought iron	2	.75	2		
Do.	Trunnion-bed bushing.	Brass	16	.75	1.5		
Screws, headless.	Elevation disk.	Wrought iron	2	.5	.75		
Do.	Gun-lever bushing.	do	2	.5	2		
Do.	Gun lever and suspension rod pins.	do	4	.75	1		
Do.	Handwheel shaft.	do	2	.5	.75		
Do.	Roller frame.	do	120	.5	1.25		Carriages Nos. 1 to 30.
Do.	do	do	68	.5	1.25		Carriages after No. 30.
Do.	Retraction spur gears.	do	2	.5	.75		
Do.	Traversing intermediate shaft.	do	2	.5	.75		
Do.	Traversing-pinion shaft.	do	2	.625	.75		
Do.	Worm-wheel casing.	do	8	.75	1.5		
Do.	Worm-wheel shaft.	do	2	.5	.75		
Do.	Yoke.	do	1	.375	.9		
Screws, roundhead.	Azimuth pointer.	Brass	2	.25	.75		
Do.	Ball-bearing cover.	do	8	.125	.25		
Do.	Base-ring cover.	do	8	.25	.6		
Do.	Direction plates.	do	36	.25	.6		
Do.	Elevation pointer.	do	4	.5	.75		
Do.	Name plates.	do	2	.25	.6		
Do.	Side covering worm-wheel casing.	Wrought iron.	9	.25	.6		
Do.	Training rack to base ring.	do	72	.625	1.9		
Separators.	Between distance rings.	Cast iron	16				
Sight caps.	On sight standard.	do	2				
Sight set screws.	Through sight cap.	Steel	2				
Sight standard.	Rear end of chassis.	Cast steel.	1				Carriages Nos. 1 to 48, inclusive, on right chassis, 49 and following on left chassis.
Sight thrust plates.	On sight.	Steel.	2				
Shot tong.	With carriage.	do	7				
Step.	On chassis.	do	2				
Do.	On racer.	do	1				
Step pin.	On top carriage.	Wrought iron.	1				
Stop pin.	In base ring.	Steel.	2				
Studs.	Elevating-arm cap.	Wrought iron.	4	1.25	5.75		
Do.	Gun-lever cap.	do	4	2	8.5	8	4 nuts 2 inches high; 4 nuts 1 inch high.
Do.	Top-carriage cap.	do	4	2	10	4	
Do.	Top-carriage rear stuffing box.	do	28	1	4.5	28	
Stuffing-box heads.	Rear end of cylinders.	Cast steel.	2				
Stuffing boxes.	Front end of cylinders.	Bronze	2				
Stuffing-box glands.	Rear stuffing boxes.	do	2				
Do.	Front stuffing boxes.	do	2				

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inch.	Inch.		
Stuffing-box followers.	Rear stuffing boxes.....	Bronze.....	2				
Do.....	Front stuffing boxes.....	do.....	2				
Suspension rods.	Through counterweight.	Forged steel..	2				
Suspension-rod nuts.	On suspension rod.....	do.....	2				
Suspension-rod pins.	In crosshead.....	do.....	2				Carriages after No. 30, 0.75-inch headless screw.
Suspension-rod shaft.	In crosshead clips.....	do.....	1				Carriages Nos. 1 to 30, two 1-inch pins.
Throttling bars....	In recoil cylinders.....	do.....	4				
Throttling-valve body.	Top carriage.....	Bronze.....	1				
Throttling-valve followers.	Throttling valve.....	do.....	3				One with 2-inch tap, two with 1.625-inch tap.
Throttling-valve gland.	do.....	do.....	1				
Throttling-valve latch.	do.....	do.....	1				
Throttling-valve seat.	Throttling valve.....	Steel.....	1				
Throttling-valve stem.	do.....	Bronze and steel.	1				
Throttling-valve yoke.	do.....	Bronze.....	1				
Thrust plates.....	Under base ring for leveling.	Steel.....	16				
Thrust washers....	On worm-wheel shaft...	Balata.....	3				
Do.....	do.....	Bronze.....	3				
Thrust disk.....	For worm shaft.....	Hardened steel.	1				
Top carriage.....	On recoil rollers.....	Gun iron.....	1				
Top-carriage caps..	On top carriage.....	Cast steel.....	2				
Top-carriage liners.	Top carriage.....	Bronze.....	10				
Top-carriage eye-bolts.	Top-carriage cap.....	Wrought iron.	2				
Trailing rack.....	Attached to base ring...	Forged steel..	1				In 3 pieces; 268 teeth.
Transom.....	Between chassis.....	Cast steel.....	1				Front.
Do.....	do.....	do.....	1				Rear.
Traversing cranks.	Traversing-crank shaft...	do.....	2				With brass sleeve.
Traversing-crank shaft.	Traversing-crank and gear brackets.	Steel.....	1				
Traversing intermediate shaft.	Traversing-gear bracket.	do.....	1				
Traversing-pinion shaft.	Traversing-gear bracket and racer.	do.....	1				
Traversing bevel pinion.	Traversing intermediate shaft.	do.....	1				0.5-inch key and 0.5-inch headless screw; 15 teeth.
Do.....	Traversing-crank shaft...	do.....	1				0.5-inch key; 18 teeth.
Traversing bevel gear.	Traversing-pinion shaft.	Bronze.....	1				0.75-inch key and 0.625-inch headless screw; 40 teeth.
Do.....	Traversing intermediate shaft.	do.....	1				0.5-inch key and 0.5-inch headless screw; 50 teeth.
Traversing-spur pinion.	Traversing-pinion shaft.	do.....	1				0.75-inch key and 0.625-inch headless screw; 12 teeth.
Traversing-gear guard.	On traversing-gear bracket.	Cast iron.....	1				
Tripping bars.....	With carriage.....	Steel.....	2				Stop riveted on bar; for some carriages.
Tripping-barhooks.	Sides of chassis.....	Wrought iron.	4				
Tripping-bar latches.	On safety-latch stud....	Steel.....	2				
Tripping-bar latch studs.	In chassis.....	do.....	2			2	With washer.
Tripping-bar latch stops.	do.....	do.....	4				
Tripping levers....	On tripping shaft.....	do.....	2				

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inch.	Inch.		
Tripping-leverrests	On floor plate.....	Steel.....	2				With keys.
Tripping shaft.....	Front of chassis.....	do.....	1				
Wedges, leveling..	Under base ring.....	do.....	3				
Wrench.....	Spanner wrench stuff- ing-box follower.....	do.....	1				
Do.....	For cylinder-head nuts..	do.....	1				
Do.....	For piston-rod nuts.....	do.....	2				
Do.....	For filling plugs.....	do.....	1				
Do.....	For 1½-inch nuts.....	do.....	1				
Do.....	For 2-inch nuts.....	do.....	1				
Do.....	For 1 and 1½ inch nuts	do.....	1				
Do.....	For 1 and 1½ inch nuts	do.....	1				

AMMUNITION TRUCK FOR CARRIAGES NOS. 1 TO 30, INCLUSIVE.

(Price of ammunition trucks separately, each \$298.)

[Three trucks for each carriage.]

Axle.....	Center gear.....	Bronze.....	1				
Ball-bearing wash- ers.....	For elevating screw.....	Steel.....	2				Bottom part.
Do.....	do.....	do.....	2				Top part.
Ball-bearing covers	do.....	Bronze.....	2				
Ball-bearing balls	do.....	Steel.....	32				
Ball-bearing wash- ers.....	For caster.....	do.....	2				Bottom part.
Do.....	do.....	do.....	2				Top part.
Ball-bearing covers	do.....	Bronze.....	2				
Ball-bearing balls	do.....	Steel.....	32				
Back plate.....	Ammunition truck.....	Wrought iron.....	1				
Bolts (hexagonal head).	Top plate.....	do.....	4	.75	10.4	4	
Do.....	Saddle plate.....	do.....	2	.75	10.4	4	
Do.....	do.....	do.....	2	.75	11.15	2	
Do.....	Front axle fork.....	do.....	6	.75	2	6	
Do.....	Caster yoke.....	do.....	6	.75	2	6	
Do.....	Filler-piece hook.....	do.....	2	.5	.9	1	
Do.....	Clutch-lever pivot.....	do.....	1	.5		1	
Do.....	Caster.....	do.....	2	1.25		2	
Do.....	Stop.....	do.....	5	.5	.9		
Busbings.....	Caster yoke.....	Bronze.....	2				
Do.....	Crank-shaft bearing.....	do.....	1				
Do.....	Front axle fork.....	do.....	2				
Do.....	Front wheel.....	do.....	1				
Do.....	Saddle plate.....	do.....	3				Two sizes.
Do.....	Top plate.....	do.....	2				
Casters.....	In truck yoke.....	Cast steel.....	2			2	With washer and steel pin cast in.
Caster wheels	In caster.....	do.....	2				
Caster-wheel pins	For caster wheel.....	Steel.....	2			2	
Caster yoke.....	In rear of truck.....	Cast iron.....	1				
Cartridge shelves..	On sides of truck.....	Wrought iron.....	2				Right and left.
Clutch gear.....	On screw nut.....	Steel.....	1				48 T., 6 P.
Clutch lever.....	Inside of truck.....	Wrought iron.....	1				With steel pins.
Clutch-lever spring	On saddle plate.....	Spring steel.....	1				
Clutch-lever ful- crum.....	On truck side plate.....	Bronze.....	1				
Clutch-lever ful- crum bolt.....	Through fulcrum.....	Wrought iron.....	1			1	
Clutch ring.....	On screw nut.....	Steel.....	1				
Crank.....	For elevating.....	Wrought iron.....	1				Brass sleeve.
Crank shaft.....	In crank bearing.....	Steel.....	1				
Crank-shaft bear- ing.....	On side of truck.....	Cast iron.....	1				
Elevating-screw nuts.....	On screw.....	Bronze.....	1				
Elevating screws..	For shot tray.....	Forged steel.....	2				
Front plate.....	On front of truck.....	Wrought iron.....	1				
Front axle.....	In front axle fork.....	Steel.....	1				
Front axle fork.....	Bolted to side plates.....	Cast iron.....	1				
Front wheels.....	On front axle.....	do.....	2				One forced on axle.
Filler piece.....	For shot tray.....	do.....	1				
Filler-piece hook	On top plate of truck.....	Wrought iron.....	1				
Gear, spur-wheel nut.....	For elevating screw.....	Bronze.....	1				48 T., 6 P.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

AMMUNITION TRUCK FOR CARRIAGES NOS. 1 TO 30, INCLUSIVE—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Gear, spur and bevel.	Center gear between spur gears.	Steel.....	1	Ins.	Ins.		0.625-inch headless screw, 36 T., 6 P.
Gear, bevel pinion.	On crank shaft.....	do	1				0.25-inch key, 24 T., 6 P. Complete.
Handle.....	For moving the truck...	Wrought iron.	1				Right and left.
Handle hinges.....	Bolted to sides.....	do	2				Split pin and washer.
Handle fulcrum pin.	Through handle.....	do	1				
Roller bearings.....	Front axle fork.....	Steel.....	2				
Do.....	In casters.....	do	2				
Roller-bearing dust-guard washers.	Front axle fork.....	do	2				Top part.
Do.....	do.....	do	2				Bottom part.
Do.....	do.....	Felt.....	2				
Saddle plate.....	Between side plates.....	Cast iron.	1				
Screws.....	Clutch spring.....	Wrought iron.	2	0.575	0.75		
Do.....	In dust-guard washer.....	Brass.....	6	.25	.625		Countersunk.
Do.....	Roller-bearing dust guard.	Wrought iron.	12	.75	1.25		Do.
Do.....	Front axle.....	do	1	.625	1.25		Cheese head.
Do.....	Roller-bearing dust guard.	do	6	.25	1.2		Do.
Do.....	For dust guard to axle fork.	do	4	.25	1.2		Do.
Do.....	For front axle.....	do	1	.625	1		Do.
Do.....	Ball-bearing covers.....	do	12	.125	.25		
Do.....	Bevel gears.....	do	1	.625	1.15		Headless screw.
Shot tray.....	On elevating screws.....	do	1				
Shot-tray brackets.	On shot tray.....	Cast steel.	2				Riveted to shot tray.
Shot-tray bracket pins.	Through screws and bracket.	Bronze.....	2				0.575-inch split pin.
Side plate.....	Sides of truck.....	Wrought iron.	2				Right and left.
Stop.....	On top plate of truck.....	Bronze.....	1				
Top plate.....	Top of truck.....	Cast iron.....	1				
Washer.....	Fastened to front axle.....	Steel.....	1				

AMMUNITION TRUCK FOR CARRIAGES NOS. 31 TO 70, INCLUSIVE.

[Three trucks for each carriage.]

Adjusting hand-wheel.	In handwheel bearing...	Bronze.....	1				
Adjusting nut.....	On elevating screw.....	do	1				
Adjusting-nut support.	For elevating screw.....	Steel.....	1				Riveted down.
Do.....	For handwheel elevating screw.	do	1				Do.
Ball-bearing washers.	Casters.....	Hardened steel.	4				Top and bottom.
Ball-bearing covers.	do.....	do	4				
Ball-bearing balls.	Caster ball bearing.....	Bronze.....	2				Two bearings.
Ball-bearing washers.	Elevating screw under elevating-wheel nut.	Steel.....	2				Top and bottom.
Ball-bearing covers.	do.....	do	2				
Ball-bearing balls.	Elevating screw, ball bearing.	Bronze.....	1				One bearing.
Ball-bearing washers.	Elevating screw under elevating wheel.	Steel.....	18				Top and bottom.
Ball-bearing covers.	do.....	do	2				
Ball-bearing balls.	Elevating screw, ball bearing.	Hardened steel.	2				Top and bottom.
Ball-bearing washers.	do.....	do	2				
Ball-bearing covers.	Elevating screw, ball bearing.	Bronze.....	1				One bearing.
Ball-bearing balls.	Elevating screw on elevating wheel.	Steel.....	26				Top and bottom.
Ball-bearing washers.	do.....	do	2				
Ball-bearing covers.	Elevating screw, ball bearing.	Hardened steel.	2				Top and bottom.
Ball-bearing balls.	do.....	do	2				
Bearing.....	On top plate for hand-wheel screw.	Copper.....	1				One bearing.
Do.....	On top plate for elevating screw.	Steel.....	75				Riveted on top plate.
Do.....	do.....	do	1				Do.
Bolts (hexagonal heads).	In caster bracket.....	Wrought iron.	4	.75	1.75	4	

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

AMMUNITION TRUCK FOR CARRIAGES NOS. 31 TO 70, INCLUSIVE—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Note.	Remarks.
Bolts (hexagonal heads).	In caster bracket.....	Wrought iron.	2	Ins. 0.75	Ins. 1.875		
Do.....	In front axle.....	do.....	3	.75	2.75	3	
Do.....	In crank-shaft bracket.....	do.....	8	.6	1.25	8	
Do.....	Elevating pinion.....	Steel.....	2	.6	1		Special.
Caster wheels.....	In caster.....	Cast steel.....	2				
Caster yokes.....	In caster bracket.....	do.....	2			2	With washers, and made right and left.
Caster pins.....	Through yoke.....	Steel.....	2			2	With split pin.
Caster brackets.....	Bolted to frame.....	Cast steel.....	2				Made right and left.
Caster bushings.....	In caster bracket.....	Bronze.....	2				
Cartridge shelves.....	On sides of truck.....	Wrought iron.....	2				With braces.
Crank.....	do.....	do.....	1				With brass sleeve
Crank shaft.....	In crank-shaft bracket.....	Steel.....	1			1	
Crank-shaft brackets.....	Bolted to side of truck.....	Bronze.....	2				One bored 1 inch; one bored 1.15 inches.
Elevating screws.....	For shot tray.....	Steel.....	2				Right and left hand threads.
Frame, front.....	Combining wheels and parts.....	Wrought iron.....	1				14-inch angle iron.
Frame, rear.....	do.....	do.....	1				Do.
Frames, brace.....	Corner pieces for frame.....	do.....	4				Front and rear.
Front axle.....	Bolted to front frame.....	Steel.....	1			2	With pin and washer.
Front wheels.....	On front axle.....	Cast steel.....	2				
Filler piece.....	On shot tray.....	do.....	1				
Filler-piece hinge.....	Bolted to shot tray.....	do.....	1				
Filler-piece hinge pin.....	Through hinge.....	Steel.....	1				With split pin.
Gear-wheel nut, elevating.....	On elevating screw.....	Bronze.....	1				43 teeth.
Gear wheel, elevating.....	On adjusting nut.....	do.....	1				0.5-inch key, 43 teeth.
Gear pinion, elevating.....	Between elevating gear wheels.....	Steel.....	1				17 teeth.
Handle.....	For moving the truck.....	Wrought iron.....	1				Complete.
Hinges for handle.....	Riveted to frame.....	do.....	2				Right and left.
Hinge pin for handle.....	Through hinge.....	do.....	1				Two washers and pins.
Roller bearings.....	In front wheel.....	Steel.....	2				
Do.....	In caster wheel.....	do.....	2				
Screws.....	Elevating pinion.....	do.....	2	.5	1		Headless set screw.
Do.....	Ball-bearing cover.....	Brass.....	6	.125	.2		Round head.
Do.....	do.....	do.....	6	.125	.25		Do.
Do.....	In stop for hand wheel.....	do.....	2	.25	.5		Do.
Do.....	For stop.....	Wrought iron.....	5	.5		5	Round head, special.
Shot tray.....	In elevating screws.....	do.....	1				
Shot-tray brackets.....	Riveted on shot tray.....	Cast steel.....	2				
Shot-tray pins.....	In shot-tray bracket.....	Bronze.....	2				With split pins.
Stop.....	On adjusting hand wheel.....	Steel.....	1				
Do.....	On top plate of truck.....	Bronze.....	1				
Top plate.....	Riveted on top of frame.....	Wrought iron.....	1				

AMMUNITION TRUCK FOR CARRIAGES AFTER NO. 70.

(Price of ammunition trucks, separately, each \$298).

Ball-bearing washers.....	Casters.....	Hardened steel.....	4				Top and bottom.
Ball-bearing covers.....	do.....	Bronze.....	2				
Ball-bearing balls.....	Caster ball bearing.....	Steel.....	36				Two bearings.
Ball-bearing washers.....	Elevating screw under elevating-wheel nut.....	Hardened steel.....	2				Top and bottom.
Ball-bearing cover.....	do.....	Bronze.....	1				
Ball-bearing balls.....	Elevating-screw ball bearing.....	Steel.....	18				One bearing.
Bevel gear.....	On center shaft.....	Bronze.....	1				With 0.25 key, 30 teeth, 6 P.
Do.....	On crank shaft.....	do.....	1				With 0.25 key, 21 teeth, 6 P.
Bolts (hexagonal head).	In caster bracket.....	Wrought iron.....	4	0.75	1.75	4	
Do.....	do.....	do.....	2	.75	1.875		

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

AMMUNITION TRUCK FOR CARRIAGES AFTER NO. 70—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Bolts (hexagonal head).	In front axle.....	Wrought iron.	3	In. 0.75	In. 2.75	3	
Do.....	In crank-shaft bracket.....	do.....	8	.5	1.25	8	
Do.....	For lever center.....	do.....	1	.5	2		
Bushing.....	In screw support.....	Bronze.....	1				
Do.....	In guide ring.....	do.....	2				
Do.....	In caster bracket.....	do.....	2				
Cartridge shelves.....	On sides of truck.....	Steel plate.....	2				
Caster wheel.....	In caster.....	Cast steel.....	2				
Caster yoke.....	In caster bracket.....	do.....	2			2	With washers, and made right and left.
Caster pins.....	Through yoke.....	Steel.....	2			2	With split pin.
Caster brackets.....	Bolted to frame.....	Cast steel.....	2				Made right and left.
Center shafts.....	Through top plate.....	Steel.....	1			1	With steel ring.
Clutch lever.....	Clutch ring.....	do.....	1				
Crank.....	On side of truck.....	Wrought iron.....	1				With brass sleeve.
Crank shaft.....	In crank-shaft bracket.....	Steel.....	1				With 0.25 key.
Crank-shaft bracket.....	Bolted to side of truck.....	Bronze.....	1				
Elevating screws.....	For shot tray.....	Steel.....	2				Right and left hand threads.
Filler piece.....	On shot tray.....	Cast steel.....	1				
Filler-piece hinge.....	Bolted to shot tray.....	do.....	1				
Filler-piece hinge pin.....	Through hinge.....	Bronze.....	1				
Frame, front.....	Combining wheels and parts.....	Wrought iron.....	1				14-inch angle iron.
Frame, rear.....	do.....	do.....	1				Do.
Frame, brace.....	Corner pieces for frame.....	do.....	4				Front and rear.
Front axle.....	Bolted to front frame.....	Steel.....	1			2	With pin and washer.
Front wheels.....	On front axle.....	Cast steel.....	2				
Guide rings.....	On top plate for elevating screw.....	Forged steel.....	2				
Handle.....	For clutch lever.....	Steel.....	1			1	With split pin.
Do.....	For moving the truck.....	Wrought iron.....	1				Complete.
Hinges for handle.....	Riveted to frame.....	do.....	2				Right and left.
Intermediate gear.....	Bevel gear.....	Steel.....	1				30 teeth.
Lever center.....	For clutch lever.....	Bronze.....	1				
Lever spring.....	On screw support.....	Steel.....	1				
Nut.....	On elevating screw.....	Bronze.....	1				With 0.25 key.
Roller bearings.....	In front wheel.....	Steel.....	2				
Do.....	In caster wheel.....	do.....	2				
Screws.....	Ball-bearing cover.....	Brass.....	12	.125	.25		Round head.
Do.....	Stop.....	Wrought iron.....	5	.5		5	Round head, special.
Screw support.....	For elevating screw.....	Steel.....	1				
Shot tray.....	In elevating screws.....	do.....	1				
Shot-tray pins.....	In shot-tray bracket.....	Bronze.....	2				With split pins.
Spur-wheel nut.....	On elevating screw.....	do.....	1				
Stop.....	On top plate of truck.....	do.....	1				
Top plate.....	Riveted on top of frame.....	Steel plate.....	1				

10-INCH DISAPPEARING CARRIAGE, A. R. F., MODEL 1896.

(Price of carriage, \$13,577.33).

Weight of principal parts.

Name of part.	Weight.
	Pounds.
Chassis, top carriage, piston rods, and assembled gearing.....	43,900
Exterior base ring.....	23,850
Exterior racer.....	9,160
Interior base ring.....	10,360
Interior racer.....	9,100
Exterior distance rings, complete.....	2,415
Interior distance rings, complete.....	1,035
Exterior rollers (48).....	2,304
Interior rollers (24).....	2,952

Weight of principal parts—Continued.

Name of part.	Weight.
	<i>Pounds.</i>
Floor ring with fastenings	3,090
Floor plates with fastenings	5,820
Bottom plate with lead filling	5,085
Lead weights	74,800
Suspension rods (2)	825
Crosshead	4,900
Gun levers (2)	9,225
Gun-lever axle	1,250
Top carriage	10,371
Recoil rollers with frame (2 sets)	1,721
Piston and rods (2)	1,240
Elevating band	800
Elevating arm	1,840
Elevating rack	1,425
Implements	360
Total weight of carriage	216,211
Weight of three ammunition trucks	1,660
Total weight	446,679

List of the parts of carriage, location, material, correct nomenclature, etc.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				<i>Ins.</i>	<i>Ins.</i>		
Asimuth circle	On dust-guard angle	Brass	1				In 12 sections.
Asimuth pointer ..	On exterior racer	do	1				With 2 dowel pins, 1/2 inch in diameter.
Asimuth-pointer lid.	do	Bronze	1				With hinge and hinge pin.
Asimuth-circle bracket.	On exterior base ring ...	Wrought iron.	32				
Base ring (inner) ..	On platform	Cast iron, No. 2	1				
Base ring (exterior) ..	do	do	1				In 8 sections.
Ball-bearing wash- ers.	Elevating worm shaft ...	Hardened steel.	2				Top and bottom parts.
Ball-bearing balls.	Between washers	do	18	0.5			
Ball-bearing cover.	Over ball-bearing washer	Bronze	1				
Beam (1)	On racers	Steel	1				Floor-plate sup- port.
Bolts (hexagonal head).	Traversing-shaft bracket	Wrought iron.	3	1	2.75		
Do	Retraction-gear bracket.	do	4	1	2.75		
Do	Vertical-shaft bracket ..	do	2	1	2.75		
Do	Clutch bracket	do	4	1	2.75		
Do	Retraction drum-shaft collar.	Steel	1	.75	1.75		Set screw.
Do	Clutch-lever guide	Wrought iron.	4	.5	1.5		
Do	Retraction-rope fastener.	do	2	.75	2		
Do	do	do	2	.75	1.8		
Do	Retraction handwheel ..	Steel	1	.75	1.75		Do.
Do	Base-ring joint	Wrought iron.	66	1.5	5.75	66	
Do	Racer joints	do	12	1	4.75	12	
Do	do	do	24	1	4.25	24	
Do	Distance rings (exterior)	do	48	.75	2.25		
Do	Racer clip to racer	do	4	1.5	8.5		
Do	Asimuth-circle brace ..	do	64	.75	1.5		
Do	Dust guard	do	128	.5	.5		
Do	Angle iron	do	64	.5	.75		
Do	Leveling screws	Bronze, No. 8	16	2	2.75		
Do	Distance rings	Wrought iron.	20	.75	2.25		
Do	Dust guard to racer	do	8	.5	2.75		
Do	Leveling screws	Bronze, No. 8	12	2	3.25		
Do	Suspension-rod nuts	Wrought iron.	8	.75	4		
Do	Handle on gun lever	do	2	.75	1.5		
Do	Chassis to racer	do	50	1.5	4.5		
Do	Equalizing-pipe straps ..	do	6	.5	.75		
Do	Throttling bars	do	38	1	3.35		Fitted bolts, spe- cial.
Do	do	do	2	1	4.1		Do.
Do	Buffer to chassis	do	4	2	11.25	4	
Do	do	do	8	1.5	10.25	8	
Do	Piston-rod brackets	do	4	1.25	3.5		

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Bolts (hexagonal head).	Sight-standard caps	Wrought iron.	8	Ina. 0.5	Ina. 2	...	
Do.....	Retraction-rope guard.....do.....	do.....	8	.5	0.75	...	
Do.....	Rear transom.....do.....	do.....	24	1.25	3.5	...	
Do.....	Front transom.....do.....	do.....	14	1.25	3.25	...	
Do.....	Retraction-shaft bracket.....do.....	do.....	4	1.25	3.25	...	
Do.....	Worm-wheel casing.....do.....	do.....	2	1.25	3	...	
Do.....	do.....do.....	do.....	2	1.25	4.75	...	
Do.....	Worm-wheel shaft cap.....do.....	do.....	2	1.25	4.25	...	
Do.....	Elevating-shaft bracket.....do.....	do.....	3	.75	2	...	
Do.....	Elevating handwheel standard to racer.....do.....	do.....	8	1	2.75	...	
Do.....	Elevating handwheel standard joint.....do.....	do.....	8	1	2	...	
Do.....	Elevating handwheel shaft bearing.....do.....	do.....	4	1	3.75	...	
Do.....	Elevating handwheel standard cover.....do.....	do.....	4	1.25	3.5	...	
Do.....	do.....do.....	do.....	4	1	3	...	
Do.....	Worm-shaft bushing.....Steel.....	Steel.....	2	.5	1.1	...	Set screw.
Do.....	Buffer-spring yoke.....Wrought iron.....	Wrought iron.....	4	.75	8	...	
Do.....	do.....do.....	do.....	8	.75	1.75	...	
Do.....	Elevating band.....do.....	do.....	2	2	20.5	2	8 threads per inch.
Do.....	do.....do.....	do.....	2	1.5	3.25	...	Set screw; special Do.
Do.....	Elevating rack.....do.....	do.....	1	1	3	...	
Do.....	Drum casing, right.....Wrought iron.....	Wrought iron.....	4	.75	3	...	
Do.....	Drum casing, left.....do.....	do.....	4	.75	1.8	...	
Do.....	Tripping-lever rest.....do.....	do.....	4	.75	1.5	4	
Do.....	Tripping lever.....Steel.....	Steel.....	2	.75	1	...	Set screw.
Do.....	Sight-standard platform ladder and braces.....Wrought iron.....	Wrought iron.....	5	1	2	...	
Do.....	Tripping-shaft bracket.....do.....	do.....	4	1	2.75	...	
Do.....	Steps on left chassis.....do.....	do.....	2	1	2.25	...	
Do.....	Top-carriage platform ladder and braces.....do.....	do.....	4	.75	1.5	...	
Do.....	Steps on right chassis.....do.....	do.....	2	1	2.25	...	
Do.....	Joint bolts in framing for floor plates.....do.....	do.....	34	.75	1.65	34	
Do.....	Angle iron to chassis.....do.....	do.....	16	.5	1.1	...	
Do.....	Beams to inner racer.....do.....	do.....	10	.75	2	...	With cast-iron washers.
Do.....	Joint plates and angles to exterior racer.....do.....	do.....	42	.75	1.3	...	
Do.....	Ladder in pit.....do.....	do.....	4	.75	1.65	4	
Do.....	do.....do.....	do.....	2	.75	2.25	2	With cast-iron washers.
Do.....	Gear guards.....do.....	do.....	5	.5	1	...	
Bracket, traversing shaft.	On exterior racer.....Cast iron.....	Cast iron.....	1	...	...	...
Bracket, vertical shaft.	On right chassis.....do.....	do.....	1	...	...	...
Bracket, retraction gear.	do.....do.....	do.....	1	...	...	...
Bracket, clutch.....do.....	do.....do.....	do.....	1	...	...	...
Bracket, piston rod.	do.....do.....	do.....	1	...	...	...
Do.....	On left chassis.....do.....	do.....	1	...	...	...
Bracket, retraction shaft.	Inside right chassis.....do.....	do.....	1	...	...	...
Bracket, elevating shaft.	On worm-wheel casing.....Cast iron, No. 2.....	Cast iron, No. 2.....	1	...	...	...
Buffers, recoil.....	On bracket on inside of chassis.....Balata and iron.....	Balata and iron.....	2	...	...	...	Complete.
Buffers, recoil, bracket.	Attached to chassis.....Cast steel, No. 1.....	Cast steel, No. 1.....	2	...	...	...	Right and left.
Buffer, recoil, plates.	Recoil buffer.....Wrought iron.....	Wrought iron.....	10	...	...	...
Buffer, recoil, caps.	do.....do.....	do.....	2	...	...	...
Buffer, recoil, cushions.	do.....do.....	do.....	12	...	...	...
Buffer, recoil, cap bolts.	do.....do.....	do.....	4	1	12.25	4	Four 0.25-inch stop pins under head. Four 0.25 split pins.
Buffer springs.....	On rear transom.....Spring steel.....	Spring steel.....	2	...	...	...	5 leaves to each spring.
Buffer spring yokes	do.....do.....	do.....	2	...	...	...
Buffers, counter recoil.	Rear stuffing-box head.....Bronze.....	Bronze.....	2	...	...	...
Bushings.....	Traversing-shaft bracket.....do.....	do.....	2	...	...	...	2 sizes.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inch.	Inch.		
Bushings.....	Retraction-gear bracket.	Bronze.....	2				2 sizes.
Do.....	Vertical shaft bracket.....	do.....	1				
Do.....	Clutch bracket.....	do.....	1				
Do.....	Tripping shaft bracket.....	do.....	2				
Do.....	Gun levers, lower end.....	do.....	2				In halves.
Do.....	Gun levers, upper end.....	do.....	2				3 sizes.
Do.....	Right chassis.....	do.....	2				2 sizes.
Do.....	Left chassis.....	do.....	2				In halves.
Do.....	Top-carriage trunnions.....	do.....	52				
Do.....	Recoil roller frames.....	do.....	1				
Do.....	Elevating-shaft bracket.....	do.....	1				Threaded, 7 per inch.
Do.....	Worm-wheel casing.....	do.....	1				Half bushing.
Do.....	Worm-wheel shaft cap.....	do.....	1				Do.
Do.....	Rear transom.....	do.....	4				
Do.....	Elevating handwheel standard.	do.....	6				In halves, 4 sizes.
Do.....	do.....	do.....	2				
Chassis.....	Elevating arm, lower end.....	Cast iron.....	1				Right hand.
Do.....	Bolted to racers.....	do.....	1				Left hand.
Clutch.....	On clutch and retraction gear shaft.	Bronze.....	1				
Clutch trunnion.....	Clutch and clutch lever.....	do.....	1				
Clutch lever.....	Clutch bracket.....	Forged steel.....	1				
Clutch-lever guide.....	Right chassis.....	Steel.....	1				
Clutch pinion.....	Clutch shaft.....	Bronze.....	1				
Clutch-lever fulcrum pin.....	Clutch bracket.....	Steel.....	1				
Clutch shaft.....	Traversing and clutch brackets.	do.....	1				0.5 square key.
Collars.....	On clutch pinion.....	Bronze.....	1				
Do.....	Clutch shaft.....	do.....	1				
Do.....	Traversing and retraction crank shaft.	do.....	1				
Do.....	Retraction drum shaft.....	do.....	1				
Counterweight.....	Suspended from cross-head.	Lead.....	52				Beginning at the top, 1st layer, detachable.
Do.....	do.....	do.....	6				2d layer.
Do.....	do.....	do.....	6				3d layer.
Do.....	do.....	do.....	1				4th layer.
Do.....	do.....	do.....	9				5th, 6th, 7th, 8th; 9th, 10th, 11th, 12th, and 13th layers.
Counterweight bottom plates.....	do.....	Cast iron, No. 2.....	1				Filled with lead.
Counterweight handles.....	In detachable pieces.....	Wrought iron.....	52				
Counterweight hooks.....	With carriage.....	Steel.....	2				
Coupling, emptying.....	Equalizing pipe.....	Bronze.....	1				
Coupling, followers.....	Emptying coupling.....	do.....	2				
Coupling, plug.....	do.....	Wrought iron.....	1				
Coupling, glands.....	do.....	Steel.....	2				
Coupling, straps.....	do.....	Wrought iron.....	2				
Coupling, packings.....	do.....	Flexible vulcanized fiber.....	8				
Covers.....	Exterior racer.....	Sheet steel.....	2				
Crosshead.....	Between chassis.....	Cast steel, No. 1.....	1				
Crosshead liners.....	In crosshead.....	Tobin bronze.....	16				
Crosshead-liner rivets.....	Through narrow liners.....	Brass.....	26				
Direction plates.....	For elevation and depression, on chassis.	Bronze.....	2				Right and left.
Do.....	For traversing, on chassis.....	do.....	2				Do.
Do.....	For retraction, on chassis.....	do.....	2				Do.
Direction plate for clutch lever.....	On clutch-lever guide.....	do.....	1				
Distance rings.....	For exterior traversing rollers.	Wrought iron.....	2				Each ring in 4 segments.
Distance rings, fish plates.....	Distance rings for exterior traversing rollers.	do.....	8				
Distance rings, separators.....	do.....	Cast iron.....	24				
Distance rings.....	For inner traversing rollers.	Wrought iron.....	2				Each ring in 2 segments.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Notes.	Remarks.
				Inch.	Inch.		
Distance rings, fish plates.	Distance rings for inner traversing rollers.	Wrought iron.	4				2 sizes.
Distance rings, separator.	do.	Cast iron.	12				
Dowel pins.	Chassis to racers.	Steel.	4				
Dust guard.	For exterior traversing rollers.	Steel plates.	1				In 10 sections. 2 sizes.
Dust-guard angle.	Asimuth-circle braces.	Steel.	1				In 10 sections.
Dust guard.	For inner traversing rollers.	Steel plate.	1				
Do.	Roller bearing for retraction drum shaft.	Steel.	1				Felt washers and 2 steel washers bored 3.06 inches.
Do.	do.	do.	1				Felt washers and 2 steel washers bored 2.80 diameter.
Door.	To pit.	do.	1				With hinges.
Door latch.	Door to pit.	do.	1				
Elevating arm.	Joining elevating rack and gun.	Cast steel, No. 1.	1				
Elevating-arm boxes.	Elevating arm, gun end.	Bronze.	2				In halves.
Elevating-arm caps.	On end of elevating arm.	Forged steel.	2				Gun end.
Elevating band.	On gun, model 1888.	Cast steel, No. 1.	1				For rifle, model 1888, stamped on band.
Do.	On gun, model 1896.	do.	1				For rifle, model 1896, stamped on band.
Elevating-rack guides.	On rear transom.	do.	2				Right and left.
Elevating rack.	In elevating-rack guides.	Bronze, No. 1.	1				24 teeth, 2 pitch.
Elevating pinion.	Engaging elevating rack.	Forged steel No. 3.	1				21 teeth, 2 pitch. Two 0.75-inch keys.
Elevating bevel pinion.	On elevating shaft.	Steel.	1				17 teeth, 3 pitch. One 0.5-inch key.
Elevating bevel gear.	On worm shaft.	Bronze, No. 3.	1				24 teeth, 3 pitch. One 0.6-inch key.
Elevating-arm shaft.	Connecting elevating arm and rack.	Forged steel No. 3.	1				
Elevation disks.	On worm-wheel shaft.	Cast iron.	2				Two 0.5-inch square keys.
Elevation disk bands.	Elevating disk.	Brass.	2				Graduated.
Elevation pointers.	On chassis.	do.	2				Two 0.25-inch dowel pins.
Elevating miter gears.	On handwheel, intermediary and elevating shafts.	Steel.	8				18 teeth, 3 pitch. Eight 0.5-inch square keys, 2 sizes.
Elevating worm and shaft.	Worm-wheel casing.	Forged steel, No. 3.	1				R. H. single threads, 1.6 inches lead. In 1 piece.
Elevating worm wheel.	Elevating worm-wheel shaft.	Bronze, No. 3.	1				27 teeth, 1.5 inches circular pitch.
Elevating handwheels.	Elevating handwheel shaft.	Wrought and cast iron.	2				Two 0.5-inch square keys.
Elevating hand-wheel shafts.	In standard.	Steel.	2				
Elevating worm-wheel cover.	Rear transom.	Sheet iron.	1				Five 0.25-inch rivets.
Elevating worm-wheel shaft.	Through chassis.	Forged steel, No. 3.	1			2	In 3 pieces, with 2 adjusting nuts and 2 brass couplings.
Elevating shaft.	do.	Steel.	1				
Elevating-rack cover.	Rear transom.	Sheet iron.	1				
Elevating worm-wheel casing.	do.	Cast iron, No. 2.	1				
Elevating intermediate shafts.	In standard.	Steel.	2				
Elevating standards.	Inner racer.	Cast iron, No. 2.	2				Each in 2 parts.

List of the parts of carriage, location, material, nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Notes.	Remarks.
				Inch.	Inch.		
Elevating standard covers.	Elevating standard	Cast iron, No. 2	2				
Elevating worm-wheel shaft cap.	Rear transom	Cast iron	1				
Extractor.	For removing gun-lever pins.	Steel	1				
Do.	For removing cylinder head.	do	2	0.75			
Floor plates	On and between racers.	do	1				21 pieces. Part of them braced with angle irons.
							Channel beams.
Floor-plate supports.	On racers	do	15				
Do.	On chassis and to floor plate.	do	8				Angles.
Floor-plate support brackets.	On racer and beams.	do	36				
Floor ring	On platform	do	1				In 16 segments.
Floor-ring fastener strips.	Riveted to floor ring	do	16				$\frac{1}{4}$ -inch rivets.
Floor-ring angles.	do	do	16				Do.
Floor-ring foundation irons.	In pier	do	16				Do.
Friction clamp	On worm-wheel shaft	Cast steel	1				Two 0.75-inch keys.
Gear guard	For crank-shaft pinion	Steel	1				
Do.	For clutch pinion	do	1				
Gun levers	Carrying gun	Cast steel, No. 1	2				Two 2 by 1.8 inch keys.
Gun-lever axle	Gun levers	Forged steel, No. 3.	1				
Gun-lever caps	Gun end of lever	do	2				
Gun-lever handle	On right gun lever	Wrought iron	1				
Gun-lever eyebolts	In gun-lever caps	do	2				
Gun-lever hooks	In gun end of lever	do	2				
Gun-lever pins	In crosshead	Forged steel, No. 3.	2				
Implement box	With carriage	Ash	1				With lock and handles.
Keys	In exterior base ring	Steel	8				1 by 2 inch keys.
Do.	In exterior racer	do	6				0.75 by 1 inch keys.
Do.	For chassis to racer	do	6				1 by 2 inch keys.
Ladder	To sight-standard platform.	Wrought iron.	1				
Do.	To top-carriage platform.	do	1				
Do.	To pit	do	1				
Ladder braces	Ladder to pit	do	2				2 sizes.
Do.	Sight stand, ladder, and chassis.	do	1				
Do.	On top carriage	do	2				Right and left.
Lifting hooks	With carriage	Steel	4				
Name plate	On right chassis	Bronze	1				
Oil plugs	In carriage	Brass					0.625-inch tap.
Do.	do	do					0.375-inch tap.
Oil can	With carriage	do	1				Capacity, 1 quart.
Do.	do	do	2				Capacity, $\frac{1}{2}$ pint.
Pawls	For crosshead, on fulcrum.	Forged steel, No. 3.	2				Right and left.
Pawl fulcrums	In chassis for crosshead pawls.	do	2			2	1 $\frac{1}{4}$ -inch nuts.
Pawl levers	On pawl fulcrum	do	2				1 right, 1 left.
Pawl-lever links	From pawl lever to pawl-lever crank.	Steel	2				
Pawl-lever link pins.	In links	Bronze	4				
Pawl-lever cranks.	On tripping shaft	Steel	2				
Pawl safety latch.	On latch stud	do	1				
Pawl safety-latch stud.	On right chassis	do	1				With bronze washers.
Pawl safety-latch spring.	From latch to chassis	Spring steel	1				
Pawl safety-latch spring pins.	In chassis and latch	Steel	2				
Pawl safety-latch dog.	On crosshead	do	1				
Pawl-springs	Crosshead pawls and pawl levers.	Spring steel	2				

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Pawl-spring pivots	On pawl lever.....	Steel, forged..	2	Ina.	Ina.		
Do.....	On crosshead pawl.....	do.....	2				
Pawl washers.....	On pawl fulcrum.....	Bronze.....	6				
Pinch bars.....	With carriage.....	Steel.....	2				
Pinch-bar hooks.....	Side of chassis.....	do.....	4				
Pipe, equalizing.....	Between recoil cylinders.....	Copper.....	1				In 2 parts.
Pipe, straps.....	Over equalizing pipe.....	Wrought iron.....	2				
Pipe, glands.....	At ends of equalizing pipe.....	Steel.....	2				
Pipe, followers.....	do.....	Bronze.....	2				
Pipe, packings.....	do.....	Flexible vulcanized fiber.....	2				
Pistons and rods.....	In recoil cylinders.....	Forged steel, No. 8.....	2			4	Nuts, 10 threads per inch.
Piston liners.....	Pistons.....	Bronze.....	8				Fastened with 1/4-inch steel pins.
Platform, sight standard.....	In rear of left chassis.....	Roller iron.....	1				
Platform, top carriage.....	On right recoil cylinder.....	do.....	1				
Platform braces.....	For sight-standard platform.....	Wrought iron.....	1				
Do.....	For top-carriage platform.....	do.....	1				
Platform hand rail.....	Top-carriage platform.....	do.....	1			4	0.75-inch nuts.
Do.....	On sight-standard platform.....	do.....	1			8	1-inch pipe elbows and nuts, with pipe threads.
Platform screen.....	Attached to frame.....	Wire netting.....	1				
Platform-screen frame.....	Sight-standard platform.....	Wrought iron.....	1				0.75-inch pipe, with elbows.
Plugs, filling.....	Top of recoil cylinders.....	Bronze.....	12				6 of the plugs in reserve. Flexible vulcanized-fiber washers.
Racer, inner.....	On traversing rollers.....	Cast steel, No. 1.....	1				
Racer, exterior.....	do.....	Cast iron and steel.....	1				In 6 segments—5 cast iron, No. 2; 1 cast steel, No. 1.
Racer clips.....	On exterior racer.....	Cast steel, No. 1.....	2				
Ratchet wheel.....	On retraction-gear shaft.....	Steel.....	1				One 0.5-inch key.
Ratchet-wheel pawl.....	Clutch bracket.....	do.....	1				
Ratchet-wheel pawl pin.....	do.....	do.....	1				
Retraction crank-shaft pinion.....	Crank shaft.....	do.....	1				18 teeth, 4 pitch. One 0.5-inch key.
Retraction intermediate bevel gear.....	Clutch shaft.....	Bronze.....	1				22 teeth, 3 pitch. One 0.5-inch key.
Retraction vertical-shaft pinion.....	Vertical shaft.....	Steel.....	1				12 teeth, 3 pitch. One 0.4-inch key.
Retraction vertical-shaft gear.....	do.....	Bronze.....	1				36 teeth, 4 pitch. One 0.4-inch key.
Retraction bevel pinion.....	Retraction-gear shaft.....	Steel.....	1				15 teeth, 3 pitch. One 0.5-inch key.
Retraction bevel gear.....	Retraction spur-pinion shaft.....	Cast steel.....	1				45 teeth, 3 pitch. One 0.5-inch key.
Retraction spur pinion.....	In retraction-gear bracket and chassis.....	Steel.....	1				12 teeth, 2 pitch. Pinion and shaft one forging.
Retraction spur gear.....	Retraction drum shaft.....	Cast steel, No. 1.....	1				60 teeth, 2 pitch. Two 0.75-inch keys.
Retraction drum-shaft.....	In chassis.....	Forged steel, No. 3.....	1				
Retraction gear shaft.....	Clutch and retraction gear bracket.....	Steel.....	1				
Retraction crank shaft.....	Front of chassis.....	do.....	1				Also for traversing.
Retraction vertical shaft.....	Traversing and vertical shaft brackets.....	do.....	1				Do.

Also for traversing.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inch.	Inch.		
Retraction ropes...	From gun lever to chain drum.	Cast steel.....	2	0.04			
Retraction-rope drum.	Retraction drum shaft..	Cast iron, No. 2	1				Right-hand.
Do.....	do.....	do.....	1				Left-hand.
Retraction-rope fasteners.	Retraction drum.....	Steel.....	2				
Retraction-rope guards.	From buffers to drums..	do.....	2				
Retraction-rope guard brackets.	Rope guard to rear transom.	do.....	2				
Retraction-rope pulleys.	In buffer bracket.....	Cast iron, No. 2	2				
Retraction-rope pulley axles.	do.....	Steel, No. 3..	2				
Retraction drum casing.	On retraction-shaft bracket.	Cast iron.....	1				Right-hand.
Do.....	On left chassis.....	do.....	1				Left-hand.
Retraction cranks.	Crank shaft.....	Steel.....	2				Also for traversing.
Retraction-crank handles.	Retraction crank.....	do.....	2				Do.
Retraction-crank sleeves.	Retraction-crank handle	Brass tubing..	2				Do.
Retraction-crank handle washers.	do.....	Steel.....	2				Do.
Retraction hand-wheel.	Retraction-gear shaft....	Bronze.....	1				0.75-inch setscrew.
Rollers, recoil.....	On top of chassis.....	Forged steel, No. 8.	26				
Rollers, traversing.	On inner base ring.....	do.....	24				
Do.....	On exterior base ring....	do.....	48				
Roller frames, recoil.	Taking recoil rollers....	Steel.....	2				Each with 2 sides.
Roller-frame stays.	In recoil-roller frame....	do.....	24				
Roller-frame end pieces.	At ends of recoil-roller frame.	do.....	4				
Roller-frame pins.	Through end pieces.....	do.....	4				
Roller bearings.	In retraction-chain pulley.	do.....	2				Bronze cages.
Do.....	In right chassis and retraction-shaft bracket.	do.....	2				Do.
Do.....	In traversing-shaft bracket and in exterior racer.	do.....	2				Do.
Do.....	In left chassis.....	do.....	1				Do.
Screws, round head.	Azimuth pointer.....	Brass.....	2	.5	0.75		
Do.....	Covers on exterior racer..	do.....	12	.375	.5		
Do.....	Name plate.....	do.....	2	.25	.5		
Do.....	Elevation pointer.....	do.....	4	.5	.75		
Do.....	Ball-bearing cover.....	do.....	3	.125	.25		
Do.....	Worm-wheel cover.....	Wrought iron.	9	.375	.5		
Do.....	Elevating-rack cover.....	do.....	7	.375	.5		
Do.....	Door lock.....	do.....	1	.5			Special, with nut and washer.
Screws, cheese-head.	Roller-bearing dustguard	do.....	6	.375	1.35		
Do.....	Training rack.....	do.....	87	.625	1.9		
Do.....	Elevating-rack stops.....	do.....	3				Special, 2 sizes.
Do.....	Elevating-rack guides....	do.....	14	1			Special.
Do.....	do.....	do.....	16	1.25	6		Do.
Screws, counter-sunk.	Roller-bearing dustguard	Brass.....	6	.25	6		
Do.....	Separator, exterior distance rings.	Wrought iron.	24	1	11.7	24	Do.
Do.....	Azimuth circle.....	Brass.....	156	.25	.5		
Do.....	Separator, inner distance rings.	Wrought iron.	12	1	15	12	Do.
Do.....	Azimuth pointer 11d hinge.	Brass.....	3	.5	1		
Do.....	Door hinge.....	Wrought iron.	4	.5	1.35	4	
Do.....	Oil holes in racer.....	do.....	6	.625	1		
Do.....	Gun-lever trunnion liners.	Brass.....	16	.75	1.5		
Do.....	Pawl safety-latch dog....	Wrought iron.	3	.5	1.8		
Do.....	Crosshead liners.....	Brass.....	24	.625	1		
Do.....	do.....	do.....	12	.625	3		
Do.....	Top-carriage trunnion bushing.	do.....	16	.75	1.5		
Do.....	Elevation graduation strip.	do.....	20	.25	.5		

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Notes.	Remarks.
Screws, counter-sunk.	Bronze bushing in elevation stand.	Brass	24	Inch. 0.25	Inch. 0.625		
Do.	Worm-wheel shaft bushing.	do	8	.25	.625		
Do.	Top-carriage platform.	Wrought iron.	2	.75	1.85	2	
Do.	Sight-standard screen.	do	8	.875	.875		
Do.	Direction plates.	do	2	.6	1		
Do.	do	Brass	16	.25	.625		
Do.	Floor plates to beams and racer.	do	222	.5	.75		
Do.	Floor ring.	do	16	1	1.6		
Screws, headless.	Vertical shaft gear.	Wrought iron.	1	.5	.75		
Do.	Vertical shaft pinion.	do	1	.5	.75		
Do.	Intermediate bevel gear.	do	1	.625	.75		
Do.	Traversing bevel gear.	do	1	.625	.75		
Do.	Clutch pinion.	Steel.	1	.625	.75		Set screw.
Do.	Ratchet wheel.	do	1	.5	.75		Do.
Do.	Retraction bevel gear.	Wrought iron.	1	.625	.75		
Do.	Retraction bevel pinion.	do	1	.625	.75		
Do.	Crank-shaft collar.	Steel.	1	.625	.75		Do.
Do.	Clutch-shaft collar.	do	1	.625	.625		Do.
Do.	Gun levers and suspension-rod pins.	Wrought iron.	4	.75	1		
Do.	Roller frames.	do	64	.5	1.25		
Do.	Elevating handwheel.	do	2	.5	.75		
Do.	Elevating miter gear.	do	6	.5	.75		
Do.	Elevating disk.	do	2	.5	.75		
Do.	Elevating bevel gear.	do	1	.5	.75		
Do.	Traversing pinion.	do	1	.625	.75		
Studs.	Gun-lever trunnion caps.	do	4	2	8.5	8	4 nuts 2 inches high, 4 nuts 1 inch high.
Do.	Top-carriage cap squares.	do	4	2	10	4	
Do.	Rear stuffing box.	do	28	1	4.5	28	
Do.	Elevating-arm caps.	do	4	1.25	5.75	8	
Steps.	On chassis.	do	1				Right chassis, front.
Do.	do	do	1				Right chassis, rear.
Stuffing-box heads.	Rear end of cylinders.	Cast steel.	2				
Stuffing boxes.	Front end of cylinders.	Bronze	2				
Stuffing-box glands.	Stuffing boxes.	do	4				In halves.
Stuffing-box followers.	do	do	4				
Suspension rods.	Through counterweights.	Forged steel, No. 3.	2				
Suspension-rod nuts.	On suspension rods.	do	2				Do.
Suspension-rod pins.	In crosshead.	do	2				
Sight standard.	Left piston-rod bracket.	Cast steel, No. 1	1				
Sight-standard caps.	Sight standard.	Cast iron.	2				
Sight-standard set screws.	Sight-standard caps.	Steel.	2				
Sight-standard thrust plates.	do	do	2				
Shot tongs.	With carriage.	do	7				Wooden handle.
Screw-driver.	do	do	1				
Do.	do	do	1				
Top-carriage.	On recoil rollers.	Gun iron.	1				
Top-carriage cap squares.	On top carriage.	Cast steel, No. 1	2				
Top-carriage eye-bolts.	Top-carriage cap squares.	Wrought iron.	2				
Thrust plates.	Under base ring for leveling.	Steel.	28				
Thrust washers.	On worm-wheel shaft.	Balata.	3				
Do.	do	Bronze	1				
Do.	Between balata washers.	do	2				
Thrust disk.	For worm shaft.	Hardened steel.	1				
Throttling bars.	In recoil cylinders.	Forged steel.	4				
Transom, rear.	Between chassis.	Cast steel, No. 1	1				
Transom, front.	do	do	1				
Traversing bevel gear.	Traversing-pinion shaft.	Bronze	1				27 teeth, 3 pitch, 0.5-inch key.
Traversing pinion.	do	do	1				12 teeth, 3 pitch, 0.5-inch key.
Traversing-pinion shaft.	In exterior racer.	Forged steel.	1				

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Training rack	Attached to exterior base ring.	Forged steel ..	1	Inch.	Inch.		544 teeth, 2 pitch, 13 pieces.
Tripping shaft.....	In tripping-shaft brackets.	Steel.....	1				
Tripping-shaft brackets.	On chassis.....	Cast iron	2				
Tripping lever	On tripping shaft.....	Steel.....	2				
Tripping-lever rests.	On floor plate	do.....	2				
Wedges, leveling	Under base rings	do.....	24				
Wrenches	Spanner wrench, stuffing-box follower.	do.....	1				
Do.....	For cylinder-head nuts	do.....	1				
Do.....	For filling plugs.....	do.....	1				
Do.....	For piston-rod nuts	do.....	2				
Do.....	For 1-inch and 1-inch nuts.	do.....	1				
Do.....	For 1-inch and 1½-inch nuts.	do.....	1				
Do.....	For 1½-inch nuts.....	do.....	1				
Do.....	For 2-inch nuts.....	do.....	1				
Do.....	For foundation bolts	do.....	1				Socket wrench.
Wrench handle.....	For foundation-bolt wrench.	do.....	1				

AMMUNITION TRUCKS.

(Price of ammunition trucks separately, each \$296.)

(Three for each carriage.)

Adjusting hand-wheel.	In handwheel bearing...	Bronze	1				
Adjusting hand-wheel stop.	Adjusting handwheel...	Steel.....	1				
Adjusting nut.....	On elevating screw.....	Bronze	1				
Adjusting-nut stop	Adjusting nut.....	Steel.....	1				
Adjusting-nut support.	For elevating screw	do.....	1				Riveted down.
Do.....	For handwheel elevating screw.	do.....	1				Do.
Ball-bearing washers.	Castors	Hardened steel.	4				Top and bottom.
Ball-bearing covers.	do.....	Bronze	2				
Ball-bearing balls.	Between washers.....	Steel.....	58	1			2 bearings.
Ball-bearing washers.	Elevating screw	Hardened steel.	2				Top and bottom.
do.....	do.....	Steel.....	1				
Ball-bearing cover.	Between washers.....	Bronze	18	0.5			1 bearing.
Ball-bearing balls.	Between washers.....	Steel.....	2				Top and bottom.
Ball-bearing washers.	Elevating handwheel screw.	Hardened steel.	2				
do.....	do.....	Bronze	1				
Ball-bearing cover.	Between washers.....	Steel.....	26	.5			1 bearing.
Ball-bearing balls.	Elevating wheel	Hardened steel.	2				Top and bottom.
Ball-bearing washers.	do.....	do.....	1				
Ball-bearing band.	Between washers.....	Copper	1				
Ball-bearing balls.	On top plate for hand-wheel screw.	Steel.....	75				1 bearing.
Bearing, hand-wheel.	do.....	do.....	1				Riveted down.
Bearing, screw	On top plate for elevating screw.	do.....	1				Do.
Bolts, hexagonal ..	Crank-shaft bracket.....	Wrought iron.	8	.5	1.25	8	
Do.....	Axle to front frame	do.....	3	.75	2.75	3	
Do.....	Caster bracket to rear frame.	do.....	4	.75	1.75	4	
Do.....	do.....	do.....	2	.75	1.875		
Crank	On side of truck	do.....	1				With brass sleeve.
Crank shaft.....	In crank-shaft bracket ..	Steel.....	1			1	
Crank-shaft brackets.	Bolted to side of truck ..	Bronze	2				1 bored 1 inch diam., 1 bored 1.15 inches diam.
Cartridge shelves..	On sides of truck.....	Steel.....	2				With braces.
Caster pins	Through yoke	do.....	2			2	With split pins.
Caster yokes.....	In caster bracket	Cast steel	2			2	Right and left; 2 washers.
Caster brackets....	Bolted to frame	do.....	2				Right and left.
Caster bushings ..	In caster bracket	Bronze	2				
Caster wheels.....	In caster yokes	Cast steel	2				

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

AMMUNITION TRUCKS—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Elevating screws..	For shot tray	Steel.....	2	Ina.	Ina.		Right and left hand thread.
Frame, front	Combining wheels and parts.....	do.....	1				14 x 14 x 1/8 inch angle.
Frame, rear	do.....	do.....	1				Do.
Frame, braces.....	Corner pieces for frame.....	do.....	4				Front and rear; 2 shapes.
Front axle.....	Bolted to front frame.....	do.....	1			2	With pins and washers.
Front wheels.....	On front axle.....	Cast steel.....	2				
Filler piece.....	On shot tray.....	do.....	1				
Filler-piece hinge.....	Riveted to shot tray.....	do.....	1				
Filler-piece hinge pin.....	Through hinge.....	Steel.....	1	1			With 0.25 split pin.
Gear-wheel nut, elevating.....	On elevating screw.....	Bronze.....	1				43 teeth.
Gear wheel, elevating.....	On elevating handwheel screw.....	do.....	1				43 teeth 0.5-inch key.
Gear pinion, elevating.....	Crank shaft.....	Steel.....	1				17 teeth.
Handle.....	For moving the truck.....	do.....	1				Complete.
Hinges for handle.....	Riveted to frame.....	do.....	2				Right and left.
Hinge pin.....	Through hinge for handle.....	do.....	1	.75			2 washers and pins.
Oil plugs.....	In truck.....	Brass.....	2				0.375 tap.
Roller bearings.....	In front wheel.....	Steel and bronze.....	2				
Do.....	In caster wheel.....	do.....	2				
Screws.....	Ball bearing for caster.....	Brass.....	6	.125	.25		Round head.
Do.....	Ball-bearing cover.....	do.....	6	.125	.2		Do.
Do.....	Handwheel stop.....	do.....	2	.25	.5		Do.
Do.....	Elevating pinion.....	Steel.....	2	.5	1		Headless screw.
Shot tray.....	In elevating screws.....	do.....	1				
Shot-tray brackets.....	Riveted on shot tray.....	Cast steel.....	2				
Shot-tray pins.....	In shot-tray bracket.....	Bronze.....	2				With split pin.
Top plate.....	Riveted on top of frame.....	Steel.....	1				

BANDS FOR 10-INCH DISAPPEARING CARRIAGES.

Disappearing carriages, L. F., model 1896, numbers 49 to 70, are provided with bands for either model gun (1888 or 1895), bands not in use being stored at Watertown Arsenal.

Ten-inch breech-loading rifles, model 1895, can not be mounted on any of the bar-bette carriages on account of the muzzle preponderance of the gun; nor on any of the disappearing carriages, L. F., model 1894, nor on disappearing carriages, L. F., model 1896, numbers 1 to 48, both inclusive, on account of the sight standard being on the right-hand side of the carriage.

Either model of gun may be mounted on 10-inch disappearing carriages, L. F., model of 1896, after number 48, and on all of the 10-inch disappearing carriages, A. R. F., model 1896, when a band to suit the model of gun is provided.

SPARE PARTS FOR CARRIAGES.

The following spare parts for 10-inch carriages are issued to the service, viz:

	Price.			
	Dis. 1894.	Dis. 1896.	A. R. F. 1896.	Barb. 1893.
1/2 set gaskets, small, per carriage.....	\$1.31	\$1.31	\$1.31	\$3.00
1 set gaskets, large, per carriage.....	1.42	1.42	1.42	3.60
1 set filling plugs per carriage.....	.60	.60	.60	.60
1 set springs, except counter-recoil and pawl-buffer springs per carriage.....		3.00		

	Price.			
	Dis. 1894.	Dis. 1898.	A. R. F. 1896.	Barb. 1898.
1 pawl safety-latch spring per carriage			\$0.15	
1 crosshead-pawl spring per carriage .....			.25	
1 brake-lever spring per carriage				
2 springs, shot tray				\$1.00
1 compression grease-cup spring per carriage		\$0.87	\$0.57	.25
1 ratchet ball-bearing spring per carriage .....		.57	.57	
1 set hydraulic packing per carriage (9 pound) .....		.50	.50	.50
1 set oil-hole plugs per carriage .....		.10	.10	.10
1 set elevation-pointer dowels per carriage .....			.05	.10
1 set throttling-bar bolts per post .....		.90	.88	.75
1 set rear stuffing-box studs per post .....		.25	.28	.25
1 set elevation-pointer screws per post .....		.05	.10	.12
1 set taper pins per post .....		.25	.25	.25
1 set split pins per each model of carriage .....		.16	.64	.02
1 set roller bearings per each model of carriage		10.35	131.40	131.40
1 set parts of equalizing and pipe-throttling device, complete per each model of carriage		53.25		
1 set bolts for rope clamp per each model of carriage .....			.10	.10
1 set screws for floor plates per each model of carriage .....			.10	.15
1 set clamp screws for sight holder per each model of carriage .....		.50	.50	.50
1 set dust-guard bolts per each model of carriage .....		.10	.10	.05
1 set platform-ladder bolts per each model of carriage .....		.10	.10	.10
1 set ball bearings per each model of carriage (retained at arsenal)		3.50	32.00	32.00
1 set springs, each model ammunition truck per post .....		.25	.25	.25
1 set of rivets for same, per post		2.50	2.50	2.50
1 handle for ammunition truck		1.25	1.25	1.25
1 set extractors for cylinder heads, each model, per post .....		.50	.50	.50
1 set extractors for stuffing boxes, each model, per post .....		.30		.50
1 set traversing stops, each model, per post		1.50	1.50	1.50
1 set elevating stops, each model, per post		1.50	1.50	1.50
1 set crosshead-pawl stops, each model, per post .....		.02	.25	.25
1 set safety-latch stops, each model, per post .....			.50	.50
1 set stops for elevating clamps, each model, per post		1.00		
1 set emptying plugs, each model barbette carriage, per post .....				.50
1 set Yale locks (No. 558), standard pattern, per post		1.00	1.00	
1 set drain plugs for elevating and traversing brackets and castings, each model, per post .....		.50	.50	.50
1 set Balata washers, each model, per post				
1 set cables for electrical-firing apparatus, each model, per post, per set		25.00	26.50	25.00
1 set crane ropes, manila, for barbette carriages, per carriage				2.11
1 set retraction ropes, per carriage		4.43	5.34	5.34
1 set screws for name and direction plates, per post .....		.08	.08	.05
2 dozen hexagonal nuts, assorted U. S. S., $\frac{1}{4}$ to $1\frac{1}{2}$ inch, per post		1.92	1.92	1.92
1 set pawl-hook pins .....		.25		

a Indicator arc and rack screws.

b Gun lever axle.

c Bolts.

NOTES.—A complete set of these parts, as far as applicable to carriages mounted at any post, should be kept on hand, except equalizing and pipe-throttling device, roller and ball bearings, which will be issued to district armament officers, to be retained at arsenals.

In ordering parts of any carriage always specify the kind, model, and number of carriage to which the part belongs.

MAKING REQUISITIONS FOR SPARE PARTS.

In making requisitions for spare parts for either gun or carriage the nomenclature given in this manual must be strictly followed. The failure to do so makes it difficult to always determine at the issuing arsenal exactly what parts are ordered issued, and the failure to do so may cause serious delay in the action on the requisition.

When spare parts for either seacoast or rapid-fire guns or carriages are called for to replace unserviceable parts the unserviceable parts, after repairs are made, should be sent to Watervliet and Watertown arsenals, respectively, for gun and carriage parts.

For allowance, annually, of paints and material for cleaning and preservation, see Supply Table, pages 359 and 360.

For further details as to care, instructions, etc., see pamphlets issued by Ordnance Department, "Instructions for mounting, using, and caring for 10-inch disappearing carriage, L. F., Model 1894;" "Instructions for mounting, etc., 10-inch disappearing carriage, A. R. F., Model 1896;" "Instructions for mounting, etc., 10-inch disappearing carriage, L. F., Model 1896."

CONTENTS OF ARMAMENT CHEST FOR 10-INCH B. L. RIFLE, MODELS 1888, 1888 M1, AND 1888 M11.

(1 armament chest, \$50.60.)

	Price each.		Price each.
1 bar screw-driver for breech-plate screws	\$1.60	1 cleaning reamer for primer seat	\$1.00
1 bar screw-driver for hinge-pin oil hole, breech-plate oil hole, rotating handle and sight, and lock-plate screws	.75	1 gunner's reamer	1.00
1 bar screw-driver for hinge pin securing breech-plate oil hole, tray-latch catch, spring-bolt shoe, and tray back-latch catch screws	.75	1 gunner's gimlet	.65
1 bar screw-driver for tray back-latch pivot, bronze bushing, vent-cover pivot and translating stud screws	.75	1 gunner's pouch	2.50
1 tool for unscrewing housing of crank latch	2.00	1 pair gunner's sleeves	per pair.. 1.18
1 obturator-nut wrench (No. 1 for guns Nos. 2 to 30, inclusive; No. 2 for all guns after No. 30)	5.90	1 gunner's lanyard	1.15
1 obturator-nut clamp-screw wrench	4.44	1 loading tray	15.00
1 locking-nut washer	1.50	1 metal scraper	.43
1 primer key	1.50	12 silk wipers, or cotton waste	.10
1 pin punch	.30	4 balls twine, assorted	per pound.. .15
1 tit wrench for obturator spindle	1.00	2 pounds copper wire, No. 12	do.... .20
1 pressure-plug wrench	1.90	2 pounds copper wire, No. 16	do.... .20
1 ring for lifting breech plate	.75	1 quire emery cloth, No. 00	per quire.. .44
1 bronze drift (large)	.40	3 wagon sponges	per pound.. 2.38
1 bronze drift (small)	.25	1 file, flat, dead smooth	.13
1 gunner's punch	.90	1 file, round, second cut	.07
		1 file, half round, smooth	.13
		1 file, three-cornered	.08
		1 copper hammer	1.25
		1 boiler maker's hammer	.75
		1 hand mallet	.16
		1 long-handled mallet	.60
		2 oilers, half pint	.13
		1 pair cutting pliers	.60
		1 monkey wrench, 18-inch	1.12
		1 monkey wrench, 12-inch	.62

CONTENTS OF ARMAMENT CHEST FOR 10-INCH B. L. RIFLE, MODEL 1895 AND 1900.

(1 armament chest, \$52.)

	Price each.		Price each.
1 bar screw-driver for spline screw for breech mechanism	\$0.75	1 hand mallet	\$0.16
1 bar screw-driver for vent-cover pivot screws	.75	1 cleaning reamer for primer seat	1.00
1 commercial screw-driver for breech-block oil-hole screw	.40	1 gunner's punch, for vent	.90
1 commercial screw-driver for spindle ball-bearing screws	.40	1 gunner's reamer, for vent	1.00
1 loading tray	15.00	1 gunner's gimlet, for vent	.55
1 primer key	1.50	1 gunner's pouch	2.50
1 tit wrench for obturator spindle	1.00	1 pair gunner's sleeves	per pair.. 1.18
1 pressure-plug wrench	1.90	1 gunner's lanyard	1.15
1 pin punch	.30	1 metal scraper (for removing paint, etc.)	.43
1 bronze drift (large)	.40	1 quire emery cloth, No. 00	per quire.. .44
1 bronze drift (small)	.25	3 wagon sponges	per pound.. 2.38
1 obturator-nut wrench	5.90	2 pounds copper wire, No. 12	do.... .20
1 obturator-nut clamp-screw wrench	4.44	2 pounds copper wire, No. 16	do.... .20
1 locking-nut washer	1.50	12 silk wipers, or cotton waste	.10
1 file, half round, smooth	.13	4 balls twine, assorted	per pound.. .16
1 file, three-cornered	.08	1 file, flat, dead smooth	.13
1 copper hammer	1.25	1 file, round, second cut	.07
1 boiler maker's hammer	.75	1 long-handled mallet	.60
		2 oilers, half pint	.13
		1 monkey wrench, 12-inch	.62
		1 monkey wrench, 18-inch	1.12
		1 pair cutting pliers	.60

a 10 pounds of cotton waste will be issued in lieu of 12 silk wipers.

CHAPTER III.

DESCRIPTION AND NOMENCLATURE OF PARTS OF 12-INCH B. L. RIFLES AND CARRIAGES.

LIST OF SPARE PARTS FOR ISSUE, ETC.

12-INCH B. L. RIFLE, MODEL 1888.

(Price of rifle, \$34,306.)

INCLUDES GUN PROPER, BREECH MECHANISM, AND SIGHTS, AS PER LIST BELOW.

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock	1	Steel....	In breech.....	Interchangeable	Block.
Breechblock oil-hole screw.	1	...do....	Top of breechblock...	Not in all blocks; interchangeable.	
Translating stud	1	...do....	Fastened to breechblock.	Interchangeable; should not be removed.	
Translating-stud screw.	1	...do....	Fastens stud to breechblock.	Interchangeable	
Rotating-bar screws..	2	...do....	In rear part of breechblock.	To attach bar for rotation in case breechblock sticks.	
Obturator, complete:					
Obturator spindle, complete—					
Obturator spindle ..	1	...do....	In breechblock.....	Interchangeable	Mushroom spindle; also wrongly called obturator.
Obturator nut.....	1	...do....	On obturator spindle.	.....do.....	Obturator-spindle nut.
Obturator locking nut.	1	...do....	On obturator spindle, rear of obturator nut.	.....do.....	Lock nut.
Vent bushing	1	Copper..	In obturator-spindle head.	Interchangeable; can not be properly inserted at fort.	
Firing attachment, complete—					
<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);"> Experimental attachments are under test; as soon as adopted list of parts will be furnished for insertion. </div> <div></div> </div>					

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Continued.					
Gas-check pad	1	Asbestos and tal-low in canvas.	On obturator spindle.	Interchangeable	Pad, gas-check.
Front split ring	1	Steel....	On obturator spindle, between head and pad.	.....do	Front exterior split ring.
Rear split ring	1	...do	On obturator spindle, between pad and filling-in disk.	.....do	Rear exterior split ring.
Small split ring	1	...do ....	.....do .....	.....do	Small interior split ring.
Filling-in disk.....	1	...do	On obturator spindle, between pad and breechblock.	.....do	Disk.
Dust cover.....	1	...do	Screwed to obturator-spindle nut.	Not interchangeable.	Dust guard.
Dust-cover screws .	3	...do	Screw dust cover to obturator-spindle nut.	Interchangeable	Dust-guard screws.
Obturator-spindle washers.	{ 2	Bronze .	{ Between obturator nut and breechblock.	{ Interchangeable, except rear one (steel), which has rear face flat.	{ Antifriction washers.
	2	Steel....			
Tray, complete:					
Tray	1	Bronze .	Fastened to breech...	Interchangeable	Console.
Hinge pin	1	Steel....	Holds tray to gun	Interchangeable; fastened in tray by two hinge-pin securing screws.	
Tray ball bearing—					
Top cup	1	...do	Held in seat at bottom of hub of tray by the securing screws.	Interchangeable	
Intermediate cup .	1	...do ....	.....do .....	.....do	
Bottom cup	1	...do ....	.....do .....	.....do	
Balls (antifriction)	48	...do ....	.....do .....	.....do	
Separators	2	...do ....	.....do .....	.....do	
Securing screws...	8	...do ....	.....do .....	.....do	
Hinge-pin securing pin, upper.	1	...do	Shorter than lower...	.....do	
Hinge-pin securing pin, lower.	1	...do	Longer than upper...	.....do	
Hinge-pin oil-hole screw.	1	...do	In hinge pin	Interchangeable; not in all guns.	
Translating roller...	1	...do	In tray	Interchangeable	
Translating crank...	1	...do	On translating roller.	.....do	
Translating-crank nut.	1	...do	Holds translating crank to translating roller.	.....do	
Translating-crank nut pin.	1	...do	Holds translating-crank nut on translating roller.	.....do	
Tray latch, complete—					
Tray-latch body...	1	...do	Fastened to tray by tray-latch pivot.	Not interchangeable.	
Tray-latch handle, male.	1	...do	In tray latch	{ Interchangeable; issued together.	
Tray-latch handle, female.	1	...do ....	.....do		
Tray-latch handle pin.	1	...do	Holds two parts of handle together.	Interchangeable	
Tray-latch pivot....	1	...do	Holds tray latch to tray.	.....do	
Tray-latch pivot washer	1	...do	On tray-latch pivot...	.....do	
Tray-latch pivot pin.	1	...do	In tray-latch pivot ..	.....do	
Tray-spring bolt....	1	...do	In tray	Interchangeable; used in some guns of this model.	
Tray-spring bolt spring.	1	...do	On tray-spring bolt...	.....do	
Tray-spring bolt....	1	...do	In tray	Interchangeable; used in all other guns of this model instead of as above.	
Tray-spring bolt spring.	1	...do	On tray-spring bolt...	.....do	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray—Continued.					
Tray-spring bolt shoe	1	Steel...	On tray-spring bolt...	Interchangeable; used in all other guns of this model instead of as above.	
Tray-spring bolt shoe screw.	1	...do...	...do...	...do...	
Tray lock, complete—					
Tray-lock bolt.....	1	...do...	In tray in rear of tray-latch pivot.	Interchangeable; used in some guns of this model; is to be attached to others.	Tray-lock cam.
Tray-lock lever....	1	...do...	Fastened to tray by tray-lock lever pivot.	...do...	
Tray-lock link.....	1	...do...	Connects lever with tray latch.	...do...	
Tray-lock link pin.	1	...do...	Connects lever with link.	...do...	
Tray-lock lever pivot.	1	...do...	Holds lever to tray...	...do...	
Tray-lock pin.....	1	...do...	Connects tray latch to link.	...do...	
Tray-lock pin nut.	1	...do...	On tray-lock pin.....	...do...	
Tray-lock pin-nut pin.	1	...do...	Through tray-lock pin nut.	...do...	
Tray-back-latch catch	1	...do...	Fastened to tray.....	Interchangeable	Securing latch catch.
Tray-back-latch catch screws.	2	...do...	Fasten tray-back-latch catch to tray.	...do...	Securing latch-catch screws.
Rotating crank:					
Rotating-crank body	1	...do...	Attached to rotating pinion.	This form of rotating crank is the latest and used on some guns of this model; is to be attached to others; interchangeable.	
Rotating-crank sleeve.	1	Bronze.	On crank spindle.....	...do...	
Rotating-crank sleeve washer.	1	Steel...	In end of crank sleeve	...do...	
Rotating-crank sleeve-washer screw.	1	...do...	Holds sleeve and washer on crank spindle.	...do...	
Rotating-crank sleeve screw.	1	...do...	Holds washer to sleeve	...do...	
Rotating-crank nut....	1	...do...	Holds rotating crank to rotating pinion.	Interchangeable	
Rotating-crank nut pin	1	...do...	Holds rotating crank nut to rotating pinion.	...do...	
Rotating pinion.....	1	...do...	In breech plate.....	...do...	
Rotating-pinion bushing.	1	Bronze.	...do...	...do...	
Rotating-pinion bushing screw.	1	Steel...	In bushing.....	...do...	
Rotating-pinion washer	1	...do...	On rotating pinion...	...do...	
Intermediate pinion...	1	...do...	Meshes with rotating pinion, etc.	...do...	
Intermediate-pinion pivot.	1	...do...	Through intermediate pinion.	...do...	
Compound gear.....	1	...do...	Meshes with rotating ring, etc.	...do...	
Compound gear pivot..	1	...do...	Through compound gear.	...do...	
Compound-gear pivot nut.	1	Bronze.	On compound gear pivot.	...do...	
Compound-gear pivot-nut pin.	1	Steel...	Through compound gear-pivot nut.	...do...	
Compound-gear bushing.	1	Bronze.	Between compound gear and pivot.	...do...	
Rotating-crank lock bolt.	1	Steel...	In rotating crank.....	...do...	
Rotating-crank lock spring.	1	...do...	...do...	...do...	
Rotating-crank lock housing.	1	Bronze.	...do...	...do...	
Rotating-crank lock washer.	1	Steel...	...do...	...do...	
Rotating-crank lock handle.	1	...do...	On crank-lock bolt...	...do...	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Rotating-crank lock-handle pin.	1	Steel....	On crank-lock bolt...	Interchangeable	
Rotating-crank lock plate, upper.	1	...do	In breech plate.....	Used in some guns; some screwed in and held from turning by spline screws; some held in by screws. Requirement should state which style is required; interchangeable.	
Rotating-crank lock plate, lower.	1	...do ....	.....do .....	.....do	
Rotating-crank lock-plate spline screws	Varies	...do	In crank-lock plates..	Interchangeable	
Rotating-crank lock-plate screws.	2	...do ....	.....do .....	.....do	
Vent cover	1	...do	In breechblock.....	.....do	
Vent-cover pivot	1	...do ....	.....do .....	.....do	
Tray back latch (securing latch):					
Tray back-latch body	1	...do	Fastened to breech...	.....do	Securing latch body.
Tray back-latch handle.	1	...do	Screwed into tray back-latch body.	.....do	Securing latch handle.
Tray back-latch pin.	1	...do	Screwed into tray back-latch handle and body.	.....do	Securing latch-handle pin.
Tray back-latch pivot	1	...do	Holds tray back latch to gun.	.....do	Securing latch pivot.

Parts attached to gun proper, but removable.

Breech plate	1	Bronze or steel.	Screwed to breech ...	Removable only at factory.	
Breech-plate screws ...	(12) (17)	Steel....	Screw breech plate to breech.	Interchangeable; the number varies in different guns.	
Tray-latch catch	1	...do	Screwed to breech plate.	Used with guns having bronze breech plate.	
Tray-latch catch screw.	1	...do	Screwed into breech plate.	.....do	
Rotating ring	1	...do	Between breech plate and breech.	Removable only at factory.	Gear ring.
Breech-plate bushing..	1	Bronse .	Screwed to front face of breech plate.	Used only on guns having steel breech plate.	
Breech-plate bushing screws.	6	Steel....	Hold breech-plate bushing to breech plate.	Interchangeable	
Breech-plate oil-hole screws.	4	...do	Top of breech plate ..	.....do	

Issued with gun as parts thereof.

Front axial sight.....	1	Steel....	Screwed into gun at trunnion.	Interchangeable	
Rear axial sight.....	1	...do	Screwed to breech of gun.	.....do	
Rear axial-sight screws	2	...do	Hold rear axial sight to gun.	.....do	
Rear tangent-sight socket-guard.	1	Brass ..	.....do	Protects rear tangent-sight seat in shipping; interchangeable.	
Rear tangent-sight socket-guard screws.	3	Steel....	In guard	Interchangeable	

12-INCH B. L. RIFLE, MODEL 1888.

Weight, 52 gross tons (116,480 pounds).

Distance between rimbases, 50.2 inches.

Length of trunnions, 8 inches.

Distance of axis of trunnions from muzzle, 291.65 inches.

Total length, 440 inches.

Length of bore, 408.25 inches.

Maximum diameter of breech, 46.2 inches.

Diameter of muzzle, 20.25 inches.

Diameter of trunnions, 14.5 inches.

Powder chamber:

Diameter, 14.2 inches.

Length, 77.33 inches.

Capacity, 12,113.5 cubic inches.

Travel of projectile in bore, 27.58 calibers, 330.92 inches.

Projectile:

Kind.	Armor-piercing shot.	Armor-piercing shell.	Cast-iron shot.
Weight (filled).....pounds..	1,000	1,000	1,000
Ratio of weight to weight of piece.....	1-117	1-117	1-117
Weight of bursting charge, gun cotton.....pounds.....		89.40	
Length.....calibers.....	8.60	4.00	8.60
Sectional density $\frac{W}{\pi r^2}$	8.94	8.94	8.94
Price each (without bursting charge or fuse).....	\$150.00	\$79.00	\$35.90

Powder:

Kind, brown prismatic and smokeless, 12-inch breech-loading rifle.

Weight, 490 pounds brown; 240 pounds smokeless.

Density of loading, 1.1133 brown; 0.5452 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.

Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.

Smokeless, 37,000 pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 25.8 inches.

Smokeless, 30.9 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 23.8 inches.

Smokeless, 28.5 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 21.2 inches.

Smokeless, 25.5 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 19.5 inches.

Smokeless, 23.5 inches.

Muzzle energy:

Brown, 28,426 foot-tons.

Smokeless, 36,671 foot-tons.

Rifling:

Number of grooves, 72.

Width of grooves, 0.3736 inch.

Rifling—Continued.

Depth of grooves, 0.08 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin; increasing to one turn in 25 calibers at 24 inches from muzzle, being uniform over the 24 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

12-INCH B. L. RIFLE, MODEL 1888 M.

(Price of rifle, \$36,306.)

INCLUDES GUN PROPER, BREECH MECHANISM, AND SIGHTS, AS PER LIST BELOW.

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.												
Breechblock, complete:																	
Breechblock.....	1	Steel ...	In breech.....	Interchangeable	Block.												
Breechblock oil-hole screw.	1	...do....	Top of breechblock...	Not in all blocks; interchangeable.													
Translating stud	1	...do....	Fastened to breechblock.	Interchangeable; should not be removed.													
Translating-stud screw.	1	...do....	Fastens stud to breechblock.	Interchangeable													
Rotating-bar screws.	2	...do....	In rear part of breechblock.	To attach bar for rotation in case breechblock sticks.													
Obturator, complete:																	
Obturator spindle, complete—																	
Obturator spindle.	1	...do....	In breechblock.....	Interchangeable	Mushroom spindle; also wrongly called obturator.												
Obturator nut.....	1	...do....	On obturator spindle.do.....	Obturator-spindle nut.												
Obturator locking nut.	1	...do....	On obturator spindle, rear of obturator nut.do.....	Lock nut.												
Vent bushing.....	1	Copper.	In obturator spindle head.	Interchangeable; can not be properly inserted at fort.													
Firing attachment, complete—																	
<div style="display: flex; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small; margin-right: 10px;"> Experimental attachments are under test. As soon as adopted, list of parts will be furnished for insertion. </div> <table> <tr> <td>Gas-check pad.....</td><td>1</td><td>Asbestos and tal-low in canvas.</td><td>On obturator spindle.</td><td>Interchangeable</td><td>Pad, gas-check.</td></tr> <tr> <td>Front split ring....</td><td>1</td><td>Steel....</td><td>On obturator spindle, between head and pad.</td><td>.....do.....</td><td>Front exterior split ring.</td></tr> </table> </div>						Gas-check pad.....	1	Asbestos and tal-low in canvas.	On obturator spindle.	Interchangeable	Pad, gas-check.	Front split ring....	1	Steel....	On obturator spindle, between head and pad.do.....	Front exterior split ring.
Gas-check pad.....	1	Asbestos and tal-low in canvas.	On obturator spindle.	Interchangeable	Pad, gas-check.												
Front split ring....	1	Steel....	On obturator spindle, between head and pad.do.....	Front exterior split ring.												

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Continued.					
Rear split ring	1	Steel....	On obturator spindle, between pad and filling-in disk.	Interchangeable	Rear exterior split ring.
Small split ring....	1	...dododo	Small interior split ring.
Filling-in disk.....	1	...do	On obturator spindle, between pad and breechblock.	...do	Diak.
Dust cover.....	1	...do	Screwed to obturator spindle nut.	Not interchangeable.	Dust guard.
Dust-cover screws .	3	...do	Screw dust cover to obturator spindle nut.	Interchangeable	Dust-guard screws.
Obturator spindle washers.	2	Bronze .	{ Between obturator nut and breechblock.	{ Interchangeable except rear one, steel, which has rear face flat.	{ Antifriction washers.
	2	Steel....			
Tray, complete:					
Tray.....	1	Bronze .	Fastened to breech...	Interchangeable	Console.
Hinge pin	1	Steel....	Holds tray to gun	Interchangeable; fastened in tray by 2 hinge-pin securing screws.	
Tray ball bearing—Top cup	1	...do	Held in seat at bottom of hub of tray by the securing screws.	Interchangeable	
Intermediate cup..	1	...do ....	...do .....	...do	
Bottom cup.....	1	...do ....	...do .....	...do	
Balls, antifriction.	48	...do ....	...do .....	...do	
Separator.....	2	...do ....	...do .....	...do	
Securing screws .	3	...do ....	...do .....	...do	
Hinge-pin securing pin, upper.	1	...do	Shorter than lower...	...do	
Hinge-pin securing pin, lower.	1	...do	Longer than upper...	...do	
Hinge-pin oil-hole screw.	1	...do	In hinge pin	Interchangeable; not in all guns.	
Translating roller ...	1	...do	In tray	Interchangeable	
Translating crank ..	1	...do	On translating roller	...do	
Translating-crank nut.	1	...do	Holds translating crank to translating roller.	...do	
Translating-crank nut pin.	1	...do	Holds translating-crank nut on translating roller.	...do	
Tray latch, complete—					
Tray-latch body...	1	...do	Fastened to tray by tray-latch pivot.	Not interchangeable	
Tray-latch handle, male.	1	...do	In tray latch	{ Interchangeable; issued together.	
Tray-latch handle, female.	1	...do ....	...do		
Tray-latch handle pin.	1	...do	Holds 2 parts of handle together.	Interchangeable	
Tray-latch pivot.....	1	...do	Holds tray latch to tray.	...do	
Tray-latch pivot washer.	1	...do	On tray-latch pivot...	...do	
Tray-latch pivot pin.	1	...do	In tray-latch pivot...	...do	
Tray-spring bolt.....	1	...do	In tray	Interchangeable; used in some guns of this model.	
Tray-spring bolt spring.	1	...do	On tray-spring bolt...	...do	
Tray-spring bolt.....	1	...do	In tray	Interchangeable; used in all other guns of this model instead of as above.	
Tray-spring bolt spring.	1	...do	On tray-spring bolt...	...do	
Tray-spring bolt shoe	1	...do ....	...do .....	...do	
Tray-spring bolt shoe screw.	1	...do ....	...do .....	...do	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray—Continued.					
Tray lock, complete— Tray-lock bolt.....	1	Steel....	In tray in rear of tray-latch pivot.	Interchangeable; used in some guns of this model; is to be attached to others.	Tray-lock cam.
Tray-lock lever....	1	...do....	Fastened to tray by tray-lock lever pivot.	...do....	
Tray-lock link.....	1	...do....	Connects lever with tray latch.	...do....	
Tray-lock link pin.	1	...do....	Connects lever with link.	...do....	
Tray-lock lever pivot.	1	...do....	Holds lever to tray	...do....	
Tray-lock pin.....	1	...do....	Connects tray latch to link.	...do....	Securing latch catch. Securing latch-catch screws.
Tray-lock pin nut.	1	...do....	On tray-lock pin.	...do....	
Tray-lock pin-nut pin.	1	...do....	Through tray-lock pin nut.	...do....	
Tray back-latch catch.	1	...do....	Fastened to tray.	Interchangeable	
Tray back-latch catch screws.	2	...do....	Fastens tray back-latch catch to tray.	...do....	
Rotating crank: Rotating-crank body	1	...do....	Attached to rotating pinion.	This form of rotating crank is the latest and used on some guns of this model; is to be attached to others; interchangeable.	
Rotating-crank sleeve.	1	Bronze.	On crank spline	...do....	
Rotating-crank sleeve washer.	1	Steel....	In end of crank sleeve	...do....	
Rotating-crank sleeve-washer screw.	1	...do....	Holds sleeve and washer on crank spindle.	...do....	
Rotating-crank sleeve screw.	1	...do....	Holds washer to sleeve	...do....	
Rotating-crank nut	1	...do....	Holds rotating crank to rotating pinion.	Interchangeable	
Rotating-crank nut pin	1	...do....	Holds rotating-crank nut to rotating pinion.	...do....	
Rotating pinion	1	...do....	In breech plate	...do....	
Rotating-pinion bushing.	1	Bronze	...do....	...do....	
Rotating-pinion bushing screw.	1	Steel	In bushing	...do....	
Rotating-pinion washer.	1	...do....	On rotating pinion	...do....	
Intermediate pinion..	1	...do....	Meshes with rotating pinion, etc.	...do....	
Intermediate-pinion pivot.	1	...do....	Through intermediate pinion.	...do....	
Compound gear	1	...do....	Meshes with rotating ring, etc.	...do....	
Compound-gear pivot.	1	...do....	Through compound gear.	...do....	
Compound-gear pivot nut.	1	Bronze	On compound-gear pivot.	...do....	
Compound-gear pivot-nut pin.	1	Steel....	Through compound-gear pivot nut.	...do....	
Compound-gear bushing.	1	Bronze	Between compound gear and pivot	...do....	
Rotating-crank lock bolt.	1	Steel....	In rotating crank	...do....	
Rotating-crank lock spring.	1	...do....	...do....	...do....	
Rotating-crank lock housing.	1	Bronze	...do....	...do....	
Rotating crank lock housing.	1	Steel....	...do....	...do....	
Rotating-crank lock handle.	1	...do....	On crank-lock bolt	...do....	
Rotating-crank lock handle pin.	1	...do....	In handle	...do....	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Rotating-crank lock plate, upper.	1	Steel....	In breech plate.....	Used in some guns; some screwed in and held from turning by spline screws; some held in by screws. Requisition should state which style is required; interchangeable.	
Rotating-crank lock plate, lower.	1	...do....	...do....	...do....	
Rotating-crank lock plate spline screws.	Varies	...do....	In crank-lock plate...	Interchangeable ...	
Rotating-crank lock plate screws.	2	...do....	...do....	...do....	
Vent cover.....	1	...do....	In breechblock.....	...do....	
Vent-cover pivot.....	1	...do....	...do....	...do....	
Tray back latch (securing latch):					
Trayback-latch body	1	...do....	Fastened to breech...	...do....	Securing latch body.
Tray back-latch handle.	1	...do....	Screwed into tray back-latch body.	...do....	Securing latch handle.
Tray back-latch pin.	1	...do....	Screwed into tray back-latch handle and body.	...do....	Securing latch handle pin.
Tray back-latch pivot.	1	...do....	Holds tray back latch to gun.	...do....	Securing latch pivot.

Parts attached to gun proper, but removable.

Breech plate	1	Bronze or steel.	Screwed to breech ...	Removable only at factory.	
Breech-plate screws ...	(12) (17)	Steel ...	Screw breech plate to breech.	Interchangeable; the number varies in different guns.	
Tray latch catch	1	...do....	Screwed to breech plate.	Used with guns having bronze breech plate.	
Tray latch-catch screw	1	...do....	Screwed into breech plate.	...do....	
Rotating ring	1	...do....	Between breech plate and breech.	Removable only at factory.	Gearing.
Breech-plate bushing .	1	Bronze .	Screwed to front face of breech plate.	Used only on guns having steel breech plate.	
Breech-plate bushing screws.	6	Steel ...	Hold breech-plate bushing to breech plate.	Interchangeable	
Breech-plate oil-hole screws.	4	...do....	Top of breech plate ..	...do....	

Issued with gun as parts thereof.

Front axial sight.....	1	Steel ...	Screwed into gun at trunnion hoop.	Interchangeable	
Rear axial sight.....	1	...do....	Screwed to breech of gun.	...do....	
Rear axial-sight screws	2	...do....	Hold rear axial sight to gun.	...do....	
Rear tangent-sight socket guard.	1	Brass ..		Protects rear tangent sight seat in shipping; interchangeable.	
Rear tangent-sight socket-guard screws.	3	Steel ...	In guard	Interchangeable	

12-INCH B. L. RIFLE, MODEL 1888 M.

Weight, 52 gross tons (116,480 pounds).
 Distance between rim bases, 50.2 inches.
 Length of trunnions, 8 inches.
 Distance of axis of trunnions from muzzle, 291.1 inches.
 Total length, 440 inches.
 Length of bore, 408.25 inches.
 Maximum diameter of breech, 46.2 inches.
 Diameter of muzzle, 20.2 inches.
 Diameter of trunnions, 14.5 inches.
 Powder chamber:
 Diameter, 14.2 inches.
 Length, 77.33 inches.
 Capacity, 12,113.5 cubic inches.
 Travel of projectile in bore, 27.58 caliber, 330.92 inches.
 Projectile:

Kind	Armor-piercing shot.	Armor-piercing shell.	Cast-iron shot.
Weight (filled).....pounds..	1,000	1,000	1,000
Ratio of weight to weight of piece.....	1-117	1-117	1-117
Weight of bursting charge, gun cotton.....pounds..		39.40	
Length.....calibers..	3.50	4.00	3.50
Sectional density $\frac{W}{V \cdot L^2}$	8.94	8.94	8.94
Price each (without bursting charge or fuse).....	\$150.00	\$79.00	\$35.90

Powder:

Kind, brown prismatic and smokeless, 12-inch breech-loading rifle.
 Weight, 490 pounds brown; 240 pounds smokeless.
 Density of loading, 1.1133 brown; 0.5452 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.
 Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.
 Smokeless, 37,000 pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 25.8 inches.
 Smokeless, 30.9 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 23.8 inches.
 Smokeless, 28.5 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 21.2 inches.
 Smokeless, 25.5 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 19.5 inches.
 Smokeless, 23.5 inches.

Muzzle energy:

Brown, 28,426 foot-tons.
 Smokeless, 36,671 foot-tons.

Rifling:

Number of grooves, 72.

Width of grooves, 0.3736 inch.

Depth of grooves 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 24 inches from muzzle, being uniform over the 24 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

12-INCH B. L. RIFLE, MODEL 1888 M₁.

(Price of rifle, \$36,306.)

INCLUDES GUN PROPER, BREECH MECHANISM, AND SIGHTS, AS PER LIST BELOW.

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock	1	Steel....	In breech.....	Interchangeable	Block.
Breechblock oil-hole screw.	1	...do....	Top of breechblock..	Not in all blocks; interchangeable.	
Translating stud	1	...do....	Fastened to breechblock.	Interchangeable; should not be removed.	
Translating-stud screw.	1	...do....	Fastens stud to breechblock.	Interchangeable	
Rotating-bar screws.	2	...do....	In rear part of breechblock.	To attach bar for rotation in case breechlock sticks.	
Obturator, complete:					
Obturator spindle, complete—					
Obturator spindle.	1	...do....	In breechblock.....	Interchangeable	Mushroom spindle; also wrongly called obturator.
Obturator nut.....	1	...do....	On obturator spindle.	.....do.....	Obturator-spindle nut.
Obturator locking nut.	1	...do....	On obturator spindle, rear of obturator nut.	.....do.....	Lock nut.
Vent bushing.....	1	Copper.	In obturator spindle-head.	Interchangeable; can not be properly inserted at fort.	
Firing attachment, complete—					
Experimental attachments are under test; as soon as adopted list of parts will be furnished for insertion.					
Gas-check pad.....	1	Asbestos and tal-low in oil pad.	On obturator spindle.	Interchangeable	Pad, gas-check.
Front split ring....	1	Steel ...	On obturator spindle between head and pad.	.....do.....	Front exterior split ring.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Continued.					
Rear split ring	1	Steel ...	On obturator spindle between pad and filling-in disk.	Interchangeable	Rear exterior split ring.
Small split ring	1	...do ...	...do ...	...do ...	Small interior split ring.
Filling-in disk	1	...do ...	On obturator spindle between pad and breechblock.	...do ...	Disk.
Dust cover	1	...do ...	Screwed to obturator-spindle nut.	Not interchangeable.	Dust guard.
Dust-cover screws ..	3	...do ...	Screw dust cover to obturator-spindle nut.	Interchangeable	Dust-guard screws.
Obturator spindle washers.	{ 2 2	{ Bronze Steel ...	{ Between obturator nut and breechblock.	{ Interchangeable; except rear one, steel, which has rear face flat.	{ Antifriction washers.
Tray, complete:					
Tray	1	Bronze ...	Fastened to breech...	Interchangeable....	Console.
Hinge pin	1	Steel ...	Holds tray to gun ...	Interchangeable; fastened in tray by 2 hinge-pin securing screws.	
Tray ball bearing—Top cup	1	...do ...	Held in seat at bottom of hub of tray by the securing screws.	Interchangeable	
Intermediate cup..	1	...do ...	...do ...	...do ...	
Bottom cup	1	...do ...	...do ...	...do ...	
Balls, antifriction ..	48	...do ...	...do ...	...do ...	
Separator	2	...do ...	...do ...	...do ...	
Securing screws ...	3	...do ...	...do ...	...do ...	
Hinge-pin securing pin, upper.	1	...do ...	Shorter than lower...	...do ...	
Hinge-pin securing pin, lower.	1	...do ...	Longer than upper...	...do ...	
Hinge-pin oil-hole screw.	1	...do ...	In hinge pin.....	Interchangeable; not in all guns.	
Translating roller ...	1	...do ...	In tray	Interchangeable	
Translating crank...	1	...do ...	On translating roller.	...do ...	
Translating-crank nut.	1	...do ...	Holds translating crank to translating roller.	...do ...	
Translating-crank nut pin.	1	...do ...	Holds translating-crank nut on translating roller.	...do ...	
Tray latch, complete—					
Tray-latch body...	1	...do ...	Fastened to tray by tray-latch pivot.	Not interchangeable.	
Tray-latch handle, male.	1	...do ...	In tray latch	Interchangeable; issued together.	
Tray-latch handle, female.	1	...do ...	...do ...		
Tray-latch handle, pin.	1	...do ...	Holds 2 parts of handle together.	Interchangeable	
Tray-latch, pivot....	1	...do ...	Holds tray latch to tray.	...do ...	
Tray-latch pivot washer.	1	...do ...	On tray-latch pivot...	...do ...	
Tray-latch pivot pin.	1	...do ...	In tray-latch pivot ...	...do ...	
Tray-spring bolt.....	1	...do ...	In tray	Interchangeable; used in some guns of this model.	
Tray-spring bolt spring.	1	...do ...	On tray-spring bolt...	...do ...	
Tray-spring bolt.....	1	...do ...	In tray	Interchangeable; used in all other guns of this model instead of as above.	
Tray-spring bolt spring.	1	...do ...	On tray-spring bolt...	...do ...	
Tray-spring bolt shoe	1	...do ...	...do ...	...do ...	
Tray-spring bolt-shoe screw.	1	...do ...	...do ...	...do ...	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray—Continued.					
Tray-lock, complete—					
Tray-lock bolt.....	1	Steel....	In tray, in rear of tray-latch pivot.	Interchangeable; used in some guns of this model; is to be attached to others.	Tray-lock cam.
Tray-lock lever....	1	do....	Fastened to tray by track-lock lever pivot.	do.....	
Tray-lock link....	1	do....	Connects lever with tray latch.	do.....	
Tray-lock link pin.	1	do....	Connects lever with link.	do.....	
Tray-lock lever pivot.	1	do....	Holds lever to tray.	do.....	
Tray-lock pin.....	1	do....	Connects tray-latch to link.	do.....	
Tray-lock pin nut.	1	do....	On tray-lock pin.	do.....	Securing-latch catch. Securing-latch catch screws.
Tray-lock pin nut pin.	1	do....	Through tray-lock pin nut.	do.....	
Tray back-latch catch.	1	do....	Fastened to tray.	Interchangeable....	
Tray back-latch catch screws.	2	do....	Fasten tray back-latch catch to tray.	do.....	
Rotating crank:					
Rotating-crank body	1	do....	Attached to rotating pinion.	This form of rotating crank is the latest and used on some guns of this model; is to be attached to others; interchangeable.	
Rotating-crank sleeve.	1	Bronze.	On crank spindle.	do.....	
Rotating-crank sleeve washer.	1	Steel....	In end of crank sleeve.	do.....	
Rotating-crank sleeve washer screw.	1	do....	Holds sleeve and washer on crank spindle.	do.....	
Rotating-crank sleeve screw.	1	do....	Holds washer to sleeve.	do.....	
Rotating-crank nut....	1	do....	Holds rotating crank to rotating pinion.	Interchangeable....	
Rotating-crank nut pin.	1	do....	Holds rotating crank nut to rotating pinion.	do.....	
Rotating pinion.....	1	do....	In breech plate.	do.....	
Rotating-pinion bushing.	1	Bronze.	do.....	do.....	
Rotating-pinion bushing screw.	1	Steel....	In bushing.	do.....	
Rotating-pinion washer.	1	do....	On rotating pinion.	do.....	
Intermediate pinion.	1	do....	Meshes with rotating pinion, etc.	do.....	
Intermediate-pinion pivot.	1	do....	Through intermediate pinion.	do.....	
Compound gear.....	1	do....	Meshes with rotating ring, etc.	do.....	
Compound-gear pivot.	1	do....	Through compound gear.	do.....	
Compound-gear pivot nut.	1	Bronze.	On compound-gear pivot.	do.....	
Compound-gear pivot nut pin.	1	Steel....	Through compound gear pivot nut.	do.....	
Compound-gear bushing.	1	Bronze.	Between compound gear and pivot.	do.....	
Rotating-crank lock bolt.	1	Steel....	In rotating crank.	do.....	
Rotating-crank lock spring.	1	do....	do.....	do.....	
Rotating-crank lock housing.	1	Bronze.	do.....	do.....	
Rotating-crank lock washer.	1	Steel....	do.....	do.....	
Rotating-crank handle.	1	do....	On crank-lock bolt.	do.....	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Rotating-crank lock-handle pin.	1	Steel....	In handle	Interchangeable	
Rotating-crank lock plate, upper.	1	...do	In breech plate.....	Used in some guns; some screwed in and held from turning by spline screws; some held in by screws. Requisition should state which style is required; interchangeable.	
Rotating-crank lock plate, lower.	1	...do ....	...do .....	...do	
Rotating-crank lock-plate spline screws.	Varies	...do	In crank-lock plate...	Interchangeable	
Rotating-crank lock-plate screws.	2	...do ....	...do .....	...do	
Vent cover	1	...do	In breechblock.....	...do	
Vent-cover pivot.....	1	...do ....	...do .....	...do	
Tray back latch (securing latch):					
Tray back-latch body	1	...do	Fastened to breech...	...do	Securing latch body.
Tray back-latch handle.	1	...do	Screwed into tray back-latch body.	...do	Securing latch handle.
Tray back-latch pin.	1	...do	Screwed into tray back-latch handle and body.	...do	Securing latch-handle pin.
Tray back-latch pivot.	1	...do	Holds tray back-latch to gun.	...do	Securing latch pivot.

Parts attached to gun proper, but removable.

Breech plate	1	Bronze or steel.	Screwed to breech....	Removable only at factory.	
Breech-plate screws...	{12 17}	Steel....	{Screw breech plate to breech.	{Interchangeable; the number varies in different guns.	
Tray-latch catch	1	...do	Screwed to breech plate.	Used with guns having bronze breech plates.	
Tray-latch catch screw	1	...do	Screwed into breech plate.	...do	
Rotating ring	1	...do	Between breech plate and breech.	Removable only at factory.	Gear ring.
Breech-plate bushing.	1	Bronze.	Screwed to front face of breech plate.	Used only on guns having steel breech plate.	
Breech-plate bushing screws.	6	Steel....	Hold breech-plate bushing to breech plate.	Interchangeable	
Breech-plate oil-hole screws.	4	...do ...	Top of breech plate ..	...do	

Issued with gun as parts thereof.

Front axial sight.....	1	Steel ...	Screwed into gun at trunnion hoop.	Interchangeable	
Rear axial sight.....	1	...do	Screwed to breech of gun.	...do	
Rear axial-sight screws	2	...do	Hold rear axial sight to gun.	...do	
Rear tangent-sight socket guard.	1	Brass ..	.....	Protects rear tangent-sight seat in shipping; interchangeable.	
Rear tangent-sight socket-guard screws.	8	Steel ...	In guard.....	Interchangeable	

12-INCH B. L. RIFLE, MODEL 1888 M1.

Weight, 52 gross tons (116,480 pounds).
 Distance between rimbases, 50.2 inches.
 Length of trunnions, 8 inches.
 Distance of axis of trunnions from muzzle, 291.1 inches.
 Total length, 440 inches.
 Length of bore, 408.8 inches.
 Maximum diameter of breech, 48.2 inches.
 Diameter of muzzle, 20.2 inches.
 Diameter of trunnions, 14.5 inches.
 Powder chamber:
 Diameter, 14.2 inches.
 Length, 77.68 inches.
 Capacity, 12,185 cubic inches.
 Travel of projectile in bore, — calibers, 331.12 inches.
 Projectile:

Kind.	Armor-piercing shot.	Armor-piercing shell.	Cast-iron shot.
Weight (filled) pounds..	1,000	1,000	1,000
Ratio of weight to weight of piece	1-117	1-117	1-117
Weight of bursting charge, gun cotton ... pounds..	.....	89.40	.....
Length calibers..	3.50	4.00	3.50
Sectional density $\frac{W}{\pi r^2}$	8.94	8.94	8.94
Price each (without bursting charge or fuse)	\$150.00	\$79.00	\$35.90

Powder:

Kind, brown prismatic and smokeless, 12-inch breech-loading rifle.
 Weight, 490 pounds brown; 240 pounds smokeless.
 Density of loading, 1.1133 brown; 0.5452 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.
 Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.
 Smokeless, 37,000 pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 25.8 inches.
 Smokeless, 30.9 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 23.8 inches.
 Smokeless, 28.5 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 21.2 inches.
 Smokeless, 25.5 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 19.5 inches.
 Smokeless, 23.5 inches.

Muzzle energy:

Brown, 28,428 foot-tons.
 Smokeless, 36,671 foot-tons.

Rifling:

Number of grooves, 72.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 24 inches from muzzle, being uniform over the 24 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.**12-INCH B. L. RIFLE, MODEL 1888 MII.**

(Price of rifle, \$36,306.)

INCLUDES GUN PROPER, BREECH MECHANISM, AND SIGHTS, AS PER LIST BELOW.

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breech block, complete:					
Breechblock	1	Steel....	In breech.....	Interchangeable	Block.
Breechblock oil-hole screw.	1	...do....	Top of breechblock ..	Not in all blocks; interchangeable.	
Translating stud	1	...do....	Fastened to breech-block.	Interchangeable; should not be removed.	
Translating-stud screw.	1	...do....	Fastens stud to breechblock.	Interchangeable	
Rotating-bar screws.	2	...do....	In rear part of breech-block.	To attach bar for rotating in case breech block sticks.	
Obturator, complete:					
Obturator spindle, complete—					
Obturator spindle.	1	...do....	In breechblock.....	Interchangeable	Mushroom spindle; also wrongly called obturator.
Obturator nut.....	1	...do....	On obturator spindle.	.....do.....	Obturator-spindle nut.
Obturator locking nut.	1	...do....	On obturator spindle, rear of obturator nut.	.....do.....	Lock nut.
Vent bushing	1	Copper .	In obturator-spindle head.	Interchangeable; cannot be properly inserted at fort.	
Firing attachment, complete—					
Experimental attachments are under test; as soon as adopted list of parts will be furnished for insertion.					
Gas-check pad	1	Asbestos and tallow in canvas.	On obturator spindle.	Interchangeable	Pad, gas-check.
Front split ring....	1	Steel....	On obturator spindle between head and pad.	.....do.....	Front exterior split ring.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Continued.					
Rear split ring.....	1	Steel....	On obturator spindle between pad and filling-in disk.	Interchangeable....	Rear exterior split ring.
Small split ring....	1	do.....	do.....	do.....	Small interior split ring.
Filling-in disk.....	1	do.....	On obturator spindle between pad and breechblock.	do.....	Disk.
Dust cover.....	1	do.....	Screwed to obturator-spindle nut.	Not interchangeable.	Dust guard.
Dust-cover screws..	3	do.....	Screw dust cover to obturator-spindle nut.	Interchangeable....	Dust-guard screws.
Obturator-spindle washers.	2	Bronze	Between obturator nut and breechblock.	Interchangeable, except rear one, steel, which has rear face flat.	Antifriction washers.
	2	Steel....			
Tray, complete:					
Tray.....	1	Bronze	Fastened to breech...	Interchangeable....	Console.
Hinge pin.....	1	Steel....	Holds tray to gun...	Interchangeable; fastened in tray by 2 hinge-pin securing screws.	
Tray ball bearing—Top cup.....	1	do.....	Held in seat at bottom of hub of tray by the securing screws.	Interchangeable....	
Intermediate cup....	1	do.....	do.....	do.....	
Bottom cup.....	1	do.....	do.....	do.....	
Balls (antifriction)	48	do.....	do.....	do.....	
Separator.....	2	do.....	do.....	do.....	
Securing screws....	3	do.....	do.....	do.....	
Hinge-pin securing pin, upper.	1	do.....	Shorter than lower.	do.....	
Hinge-pin securing pin, lower.	1	do.....	Longer than upper.	do.....	
Hinge-pin oil-hole screw.	1	do.....	In hinge pin.....	Interchangeable; not in all guns.	
Translating roller...	1	do.....	In tray.....	Interchangeable....	
Translating crank...	1	do.....	On translating roller.	do.....	
Translating-crank nut.	1	do.....	Holds translating crank to translating roller.	do.....	
Translating-crank nut pin.	1	do.....	Holds translating crank-nut to translating roller.	do.....	
Tray latch, complete:					
Tray-latch body.....	1	do.....	Fastened to tray by latch pivot.	Not interchangeable.	
Tray-latch handle, male.	1	do.....	In tray latch.....	Interchangeable; issued together.	
Tray-latch handle, female.	1	do.....	do.....		
Tray-latch handle pin.	1	do.....	Holds 2 parts of handle together.	Interchangeable....	
Tray-latch pivot.....	1	do.....	Holds tray latch to tray	do.....	
Tray-latch pivot washer.	1	do.....	On tray-latch pivot.	do.....	
Tray-latch pivot pin..	1	do.....	In tray-latch pivot.	do.....	
Tray-spring bolt.....	1	do.....	In tray.....	Interchangeable; used in some guns of this model.	
Tray-spring bolt spring	1	do.....	On tray-spring bolt.	do.....	
Tray-spring bolt.....	1	do.....	In tray.....	Interchangeable; used in all other guns of this model instead of as above.	
Tray-spring bolt spring	1	do.....	On tray-spring bolt.	do.....	
Tray-spring bolt shoe.	1	do.....	do.....	do.....	
Tray-spring bolt-shoe screw.	1	do.....	do.....	do.....	
Tray lock, complete:					
Tray-lock bolt.....	1	do.....	In tray in rear of tray-latch pivot.	Interchangeable; used in some guns of this model; is to be attached to others.	
Tray-lock lever.....	1	do.....	Fastened to tray by tray-lock lever pivot.	do.....	Tray-lock cur.
Tray-lock link.....	1	do.....	Connects lever with tray latch.	do.....	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray lock—Continued.					
Tray-lock link pin...	1	Steel ...	Connects lever with link.	Interchangeable; used in some guns of this model; is to be attached to others.	
Tray-lock lever pivot	1	do ...	Holds lever to tray	do	
Tray-lock pin.....	1	do ...	Connects tray latch to link.	do	
Tray-lock pin nut ...	1	do ...	On tray-lock pin	do	
Tray-lock pin-nut pin.	1	do ...	Through tray-lock pin nut.	do	
Tray-back latch catch.	1	do ...	Fastened to tray	Interchangeable	Securing latch catch.
Tray-back latch-catch screw.	2	do ...	Fasten tray-back latch catch to tray.	do	Securing latch-catch screws.
Rotating crank:					
Rotating-crank body	1	do ...	Attached to rotating pinion.	This form of rotating crank is the latest and used on some guns of this model; is to be attached to others; interchangeable.	
Rotating-crank sleeve.	1	Bronze	On crank spindle.	do	
Rotating-crank sleeve washer.	1	Steel...	In end of crank sleeve.	do	
Rotating-crank sleeve-washer screw.	1	do ...	Holds sleeve and washer on crank spindle.	do	
Rotating-crank sleeve screw.	1	do ...	Holds washer to sleeve.	do	
Rotating-crank nut ...	1	do ...	Holds rotating-crank nut to rotating pinion.	Interchangeable	
Rotating-crank nut pin.	1	Steel...	do	do	
Rotating pinion	1	do ...	In breech plate	do	
Rotating-pinion bushing.	1	Bronze	do	do	
Rotating-pinion bushing screw.	1	Steel...	In bushing	do	
Rotating-pinion washer.	1	do ...	On rotating pinion	do	
Intermediate pinion ..	1	do ...	Meshes with rotating pinion, etc.	do	
Intermediate-pinion pivot.	1	do ...	Through intermediate pinion.	do	
Compound gear	1	do ...	Meshes with rotating ring, etc.	do	
Compound-gear pivot.	1	do ...	Through compound gear.	do	
Compound-gear pivot nut.	1	Bronze	On compound-gear pivot.	do	
Compound-gear pivot-nut pin.	1	Steel...	Through compound-gear pivot nut.	do	
Compound-gear bushing.	1	Bronze	Between compound-gear pivot.	do	
Rotating-crank lock bolt.	1	Steel ...	In rotating crank	do	
Rotating-crank lock spring.	1	do ...	do	do	
Rotating-crank lock housing.	1	Bronze	do	do	
Rotating-crank lock washer.	1	Steel...	do	do	
Rotating-crank lock handle.	1	do ...	On crank-lock bolt.	do	
Rotating-crank lock handle pin.	1	do ...	In handle	do	
Rotating-crank lock plate, upper.	1	do ...	In breech plate.	Used in some guns; some screwed in and held from turning by spine screws; some held in by screws. Requisition should state which style is required. Interchangeable.	
Rotating-crank lock plate, lower.	1	do ...	do	do	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Rotating-crank lock plate, spline screws.	Varies	Steel....	In crank-lock plates..	Interchangeable	
Rotating-crank lock plate screws.	2	...do ....	...do .....	...do
Vent cover	1	...do	In breechblock .....	...do
Vent-cover pivot	1	...do ....	...do .....	...do
Tray back-latch (securing latch)—					
Tray back-latch body	1	...do	Fastened to breech...	...do	
Tray back-latch handle.	1	...do	Screwed into tray back-latch body.	...do	
Tray back-latch pin.	1	...do	Screwed into tray back-latch handle and body.	...do	
Tray back-latch pivot.	1	...do	Holds tray back-latch to gun.	...do	Securing latch body. Securing latch handle. Securing latch-handle pin. Securing latch pivot.

Parts attached to gun proper, but removable.

Breech plate	1	Bronze or steel.	Screwed to breech....	Removable only at factory.	Gear ring.
Breech-plate screws...	(12 17)	Steel ...	Screw breech plate to breech.	Interchangeable; the number varies in different guns.	
Tray-latch catch	1	...do	Screwed to breech plate.	Used with guns having bronze breech plates.	
Tray-latch catch screw	1	...do	Screwed into breech plate.	...do	
Rotating ring	1	...do	Between breech plate and breech.	Removable only at factory.	
Breech-plate bushing..	1	Bronze .	Screwed to front face of breech plate.	Used only on guns having steel breech plate.	
Breech-plate bushing screws.	6	Steel....	Hold breech-plate bushing to breech plate.	Interchangeable	
Breech-plate oil-hole screws.	4	...do	Top of breech plate ..	...do

Issued with gun as parts thereof.

Front axial sight	1	Steel....	Screwed into gun at trunnion hoop.	Interchangeable	
Rear axial sight	1	...do	Screwed to breech of gun.	...do	
Rear axial sight-screws	2	...do	Hold rear axial sight to gun.	...do	
Rear-tangent sight socket guard.	1	Brass ..	.....	Protects rear tangent sight seat in shipping; interchangeable.
Rear-tangent sight socket-guard screws.	3	Steel....	In guard	Interchangeable	

12-INCH B. L. RIFLE, MODEL 1888 M II.

Weight, 52 gross tons (116,480 pounds).
 Distance between rimbases, 50.2 inches.
 Length of trunnions, 8 inches.
 Distance of axis of trunnions from muzzle, 291.1 inches.
 Total length, 440 inches.
 Length of bore, 408.8 inches.
 Maximum diameter of breech, 46.2 inches.
 Diameter of muzzle, 20.2 inches.
 Diameter of trunnions, 14.5 inches.
 Powder chamber:
 Diameter, 14.2 inches.
 Length, 77.68 inches.
 Capacity, 12,185 cubic inches.
 Travel of projectile in bore, 27.59 calibers, 331.12 inches.
 Projectile:

Kind.	Armor-piercing shot.	Armor-piercing shell.	Cast-iron shot.
Weight (filled).....pounds..	1,000	1,000	1,000
Ratio of weight to weight of piece.....	1-117	1-117	1-117
Weight of bursting charge, gun cotton.....pounds..		39.40	
Length.....calibers..	3.50	4.00	3.50
Sectional density $\frac{W}{V}$	8.94	8.94	8.94
Price each (without bursting charge or fuse).....	\$150.00	\$79.00	\$35.90

Powder:

Kind, brown prismatic and smokeless, 12-inch breech-loading rifle.
 Weight, 490 pounds brown; 240 pounds smokeless.
 Density of loading, 1.1133 brown; 0.5452 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.
 Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.
 Smokeless, 37,000 pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 25.8 inches.
 Smokeless, 30.9 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 23.8 inches.
 Smokeless, 28.5 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 21.2 inches.
 Smokeless, 25.5 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 19.5 inches.
 Smokeless, 23.5 inches.

Muzzle energy:

Brown, 28,426 foot-tons.
 Smokeless, 36,671 foot-tons.

Rifling:

Number of grooves, 72.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 24 inches from muzzle, being uniform over the 24 inches.

POWDER NOTE.—The weights given are approximate. The exact weight, giving the standard muzzle velocity, is determined from the acceptance test and issue for charges.

12-INCH B. L. RIFLE, MODEL 1895.

(Price of rifle, \$36,306.)

INCLUDES GUN PROPER, BREECH MECHANISM, AND PARTS ATTACHED TO GUN BUT REMOVABLE (SEE LIST BELOW).

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock	1	Steel	In breech	Interchangeable	Blocks.
Breechblock off-hole screw	1	do	In breechblock	do	
Vent cover	1	do	do	do	
Vent-cover pivot	1	do	Holds vent cover to breechblock.	do	
Obturator, complete:					
Obturator spindle, complete—					
Obturator spindle	1	do	In breechblock	do	Spindle, mushroom; also wrongly called obturator.
Vent bushing	1	Copper	Pressed into obturator-spindle head.	do	
Pressure-plug screws	2	Steel	In obturator-spindle head.	do	
Pressure-plug washers	2	do	On pressure-plug screws.	do	
Obturator nut	1	do	On rear end of obturator spindle.	do	Obturator-spindle nut.
Obturator locking nut	1	do	do	do	Lock nut.
Firing attachment, complete—					
[Experimental attachments are under test; as soon as adopted list of parts will be furnished for insertion.]					
Front split ring	1	Steel	Against rear face of obturator-spindle head.	Interchangeable	Front exterior split ring.
Rear split ring	1	do	In rear of gas-check pad.	do	Rear exterior split ring.
Small split ring	1	do	do	do	Spindle split ring, interior split ring.
Filling-in disk	1	do	Between front face of breechblock and gas-check pad, etc.	do	Disk.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Continued.					
Gas-check pad.....	1	Asbestos and tal-low in canvas.	Between obturator-spindle head, split rings, etc.	Interchangeable	Gas-check pad.
Obturator washer: Obturator-washer cup, front.	1	Steel....	Between obturator-spindle nut and shoulder in breech-lock.	....do	
Obturator-washer cup, rear.	1	....do .....	....do .....	....do	
Obturator-washer connector.	1	....do	Holds cups together..	Not interchangeable	
Obturator-washer balls.	32	....do	Between cups	Interchangeable	
Obturator-washer screws.	4	....do	Hold cups and washer together.	....do	
Tray, complete.					
Tray.....	1	....do	Fastened to breech.	....do	Console.
Hinge pin	1	....do	Enters two lugs in hinge.	....do	
Hinge-pin nut.....	1	....do	On hinge pin .....	....do	
Hinge-pin nut pin...	1	....do	In hinge-pin nut .....	....do	
Hinge-pin oil-hole screw.	1	....do .....	....do .....	....do	
Hinge-pin securing screw.	1	....do	In hinge and hinge pin	....do	
Tray ball bearing: Cups for tray ball bearing.	2	....do .....	....do .....	....do	
Connector for tray ball bearing.	1	Copper ..	Connects cups	Interchangeable, but can not be inserted at fort.	
Balls for tray ball bearing.	22	Steel....	Between upper and lower cups.	Interchangeable	
Tray latch.....	1	....do	Pivoted to tray .....	....do	
Tray-latch pivot.....	1	....do	Holds tray latch to tray	....do	
Tray-latch spring.....	1	....do	In tray latch.....	....do	
Tray-latch lock bolt.	1	....do	In tray .....	....do	
Tray-latch lock-bolt spring.	1	....do	On tray-latch catch bolt.	....do	
Tray-latch operating stud.	1	....do	Between tray latch and tray.	....do	
Worm wheel	1	Bronze or steel.	Lower end of hinge pin.	Not interchangeable; worm wheel, with its worm shaft, fits any gun of this model.	
Worm shaft.....	1	Steel....	In lower part hinge.	....do	Worm.
Worm-shaft bushing..	1	Bronze ..	Inner end worm shaft	Interchangeable	
Worm-shaft housing..	1	....do	Screws into hinge; holds worm shaft.	....do	
Thrust bearings for worm shaft (2): Thrust-bearing cups.	2	Steel....	On worm shaft; one at inner end; one against housing.	Thrust bearings, as a whole; interchangeable.	
Conductors for thrust bearing.	2	Bronze ..	....do .....	....do	
Balls for thrust bearing.	24	Steel....	....do .....	....do	
Operating crank:					
Operating-crank body.	1	....do	On square end of worm shaft.	Interchangeable	
Operating-crank set screw.	1	....do	Secures operating-crank body to worm shaft.	....do	
Operating-crank spindle.	1	....do	On outer end operating-crank body.	....do	
Operating-crank spindle nut.	1	....do	On inner end operating-crank spindle.	....do	
Operating-crank spindle sleeve.	1	Bronze ..	On operating-crank spindle.	....do	
Operating-crank spindle-sleeve nut.	1	Steel....	In outer end operating-crank spindle sleeve.	....do	
Operating-crank spindle-sleeve nut pin.	1	....do	Secures nut to sleeve.	....do	
Compound gear	1	....do	On upper end of hinge pin.	....do	

Parts attached to gun, but removable.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Hinge	1	Steel ...	Fastened to breech of gun.	Removable only at factory.	Hinge plate, hinge block.
Hinge screws, short ...	5	...do ...	Attaching to breech	...do ...	Hinge-plate screws.
Hinge screws, long....	2	...do ...	...do ...	...do ...	Hinge-block screws.
Tray-latch catch	1	...do ...	Screwed into breech of gun.	Interchangeable ...	
Tray-latch catch spline screw.	1	...do ...	Screwed into breech of gun and tray-latch catch.	...do ...	
Front axial sight.....	1	...do ...	Top of trunnion hoop.	...do ...	
Rear axial sight.....	1	...do ...	Top of gun near breech	...do ...	
Rear axial-sight screw.	2	...do ...	Top of breech of gun.	...do ...	
Rear sight plugs.....	2	...do ...	Close screw holes when axial sight is removed.	...do ...	
Front sight plug.....	1	...do ...	Close screw hole when axial sight is removed.	...do ...	

12-INCH B. L. RIFLE, MODEL 1895.

Weight, 52 gross tons (116,480 pounds).

Distance between rim bases, 50.2 inches.

Length of trunnions, 8 inches.

Distance of axis of trunnions from muzzle, 289.6 inches.

Total length, 442.6 inches.

Length of bore, 420 inches.

Maximum diameter of breech, 44.5 inches.

Diameter of muzzle, 21 inches.

Diameter of trunnions, 14.5 inches.

Powder chamber:

Diameter, 14.2 inches.

Length, 77.68 inches.

Capacity, 12,188.5 cubic inches.

Travel of projectile in bore, 28.52 calibers, 342.32 inches.

Projectile:

Kind.	Armor-piercing shot.	Armor-piercing shell.	Cast-iron shot.
Weight (filled)	1,000	1,000	1,000
Ratio of weight to weight of piece	1-117	1-117	1-117
Weight of bursting charge, gun cotton.....		89.40	
Length	3.50	4.00	8.50
Sectional density $\frac{W}{L^2}$	8.94	8.94	8.94
Price each (without bursting charge or fuse)	\$150.00	\$79.00	\$35.90

Powder:

Kind, brown prismatic and smokeless, 12-inch breech-loading rifle.

Weight, 490 pounds brown, 240 pounds smokeless.

Density of loading, 1.1133 brown; 0.5452 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.

Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.

Smokeless, 37,000 pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 25.8 inches.

Smokeless, 30.9 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 23.8 inches.

Smokeless, 28.5 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 21.2 inches.

Smokeless, 25.5 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 19.5 inches.

Smokeless, 23.5 inches.

Muzzle energy:

Brown, 28,426 foot-tons.

Smokeless, 36,671 foot-tons.

Rifling:

Number of grooves, 72.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 36 inches from muzzle, being uniform over the 36 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

12-INCH B. L. RIFLE, MODEL 1895 M.

(Price of rifle, \$36,306.)

INCLUDES GUN PROPER, BREECH MECHANISM, AND PARTS ATTACHED TO GUN, BUT REMOVABLE (SEE LIST BELOW).

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock	1	Steel....	In breech	Interchangeable	Block.
Breechblock oil-hole screw.	1	do	In breechblock	do	
Vent cover	1	do	do	do	
Vent-cover pivot	1	do	Holds vent cover to breechblock.	do	
Obturator, complete:					
Obturator spindle, complete—					
Obturator spindle..	1	Steel....	In breechblock	do	Spindle, mushroom; also wrongly called obturator.
Vent bushing	1	Copper .	Pressed into obturator-spindle head.	do	
Pressure-plug screws.	2	Steel....	In obturator-spindle head.	do	
Pressure-plug washers.	2	do	On pressure-plug screws.	do	
Obturator nut	1	do	On rear end of obturator spindle.	do	Obturator-spindle nut. Lock nut.
Obturator locking nut.	1	do	do	do	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Continued. Firing attachment, complete—					
Experimental attachments are under test; as soon as adopted list of parts will be furnished for insertion.					
Front split ring.....	1	Steel....	Against rear face of obturator-spindle head.	Interchangeable	Front exterior split ring.
Rear split ring	1	...do....	In rear of gas-check pad.	...do.....	Rear exterior split ring.
Small split ring	1	...do....	...do.....	...do.....	Spindle split ring; interior split ring.
Filling-in disk	1	...do....	Between front face of breechblock and gas-check pad, etc.	...do.....	Disk.
Gas-check pad	1	Asbestos and tallow in canvas.	Between obturator-spindle head, split rings, etc.	...do.....	Gas check, pad.
Obturator washer— Obturator-washer cup, front.	1	Steel....	Between obturator-spindle nut and shoulder in breech-block.	...do.....	
Obturator-washer cup, rear.	1	...do....	...do.....	...do.....	
Obturator-washer connector.	1	...do....	Holds cups together..	Not interchangeable.	
Obturator-washer balls.	32	...do....	Between cups	Interchangeable	
Obturator-washer screws.	4	...do....	Holds cups and washer together.	...do.....	
Tray, complete:					
Tray.....	1	...do....	Fastened to breech...	...do.....	Console.
Hinge pin.....	1	...do....	Enters two lugs in hinge.	...do.....	
Hinge-pin nut.....	1	...do....	On hinge pin.....	...do.....	
Hinge-pin nut pin...	1	...do....	In hinge-pin nut .....	...do.....	
Hinge-pin oil-hole screw.	1	...do....	...do.....	...do.....	
Hinge pin securing screws.	1	...do....	In hinge and hinge pin.	...do.....	
Tray ball bearing— Cups for tray ball bearing.	2	...do....	...do.....	...do.....	
Connector for tray ball bearing.	1	Copper.	Connects cups.....	Interchangeable, but can not be inserted at fort.	
Balls for tray ball bearing.	22	Steel....	Between upper and lower cups.	Interchangeable	
Tray latch.....	1	...do....	Pivoted to tray.....	...do.....	
Tray-latch pivot.....	1	...do....	Holds tray latch to tray	...do.....	
Tray-latch spring	1	...do....	In tray latch .....	...do.....	
Tray-latch lock bolt.	1	...do....	In tray .....	...do.....	
Tray-latch lock-bolt spring.	1	...do....	On tray-latch catch bolt.	...do.....	
Tray-latch operating stud.	1	...do....	Between tray latch and tray.	...do.....	
Worm wheel	1	Bronze and steel.	Lower end of hinge pin.	Not interchangeable; worm wheel, with its worm shaft, fits any gun of this model.	
Worm shaft.....	1	Steel....	In lower part hinge ..	...do.....	Worm.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray—Continued.					
Worm-shaft bushing.	1	Bronze.	Inner end worm shaft.	Interchangeable	
Worm-shaft housing.	1	...do....	Screws into hinge; holds worm shaft.	.....do.....	
Thrust bearing for worm shaft (2)—Thrust-bearing cups.	2	Steel....	On worm shaft; one at inner end; one against housing.	Thrust bearings, as a whole, interchangeable.	
Connectors for thrust bearing.	2	Bronze.	.....do.....	.....do.....	
Balls for thrust bearing.	24	Steel....	.....do.....	.....do.....	
Operating crank—Operating crank body.	1	...do....	On square end of worm shaft.	Interchangeable	
Operating-crank set screw.	1	...do....	Secures operating-crank body to worm shaft.	.....do.....	
Operating-crank spindle.	1	...do....	On outer end operating-crank body.	.....do.....	
Operating-crank spindle nut.	1	...do....	On inner end operating-crank spindle.	.....do.....	
Operating-crank spindle sleeve.	1	Bronze.	On operating-crank spindle.	.....do.....	
Operating-crank spindle-sleeve nut.	1	Steel....	In outer end operating-crank spindle sleeve.	.....do.....	
Operating-crank spindle-sleeve nut pin.	1	...do....	Secures nut to sleeve.	.....do.....	
Compound gear.	1	...do....	On upper end of hinge pin.	.....do.....	

Parts attached to gun, but removable.

Hinge	1	Steel....	Fastened to breech of gun.	Removable only at factory.	Hinge plate, hinge block.
Hinge screws, short....	6	...do....	Attach hinge to breech.	.....do.....	Hinge-plate screws.
Hinge screws, long	2	...do....	.....do.....	.....do.....	Hinge-block screws.
Tray-latch catch	1	...do....	Screwed into breech of gun.	.....do.....	
Tray-latch catch spline screw.	1	...do....	Screwed into breech of gun and tray-latch catch.	.....do.....	
Front axial sight.....	1	...do....	Top of trunnion hoop.	.....do.....	
Rear axial sight.....	1	...do....	Top of gun near breech.	.....do.....	
Rear axial sight screws	2	...do....	Top of breech of gun.	.....do.....	
Rear sight plugs.....	2	...do....	Close screw holes when axial sight is removed.	.....do.....	
Front sight plug.....	1	...do....	.....do.....	.....do.....	

12-INCH B. L. RIFLE, MODEL 1895 M1.

Weight, 52 gross tons (116,480 pounds).

Distance between rimbases, 50.2 inches.

Length of trunnions, 8 inches.

Distance of axis of trunnions from muzzle, 289.6 inches.

Total length, 442.6 inches.

Length of bore, 418.05 inches.

Maximum diameter of breech, 44.5 inches.

Diameter of muzzle, 21 inches.

Diameter of trunnions, 14.5 inches.

Powder chamber:

Diameter, 14.2 inches.

Length, 77.68 inches.

Capacity, 12,185 cubic inches.

Travel of projectile in bore, 28.36 calibers, 340.37 inches.
Projectile:

Kind.	Armor-piercing shot.	Armor-piercing shell.	Cast-iron shot.
Weight (filled).....pounds.....	1,000	1,000	1,000
Ratio of weight to weight of piece.....	1-117	1-117	1-117
Weight of bursting charge, gun cotton.....pounds.....		39.40	
Length.....calibers.....	3.50	4.00	3.50
Sectional density $\frac{W}{L^2}$	8.94	8.94	8.94
Price each (without bursting charge or fuse).....	\$150.00	\$79.00	\$35.90

Powder:

Kind, brown prismatic and smokeless, 12-inch breech-loading rifle.

Weight, 490 pounds brown; 240 pounds smokeless.

Density of loading, 1.1133 brown; 0.5452 smokeless.

Muzzle velocity:

Brown, 2,025 feet per second.

Smokeless, 2,300 feet per second.

Maximum pressure per square inch:

Brown, 38,000 pounds.

Smokeless, 37,000 pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, 25.8 inches.

Smokeless, 30.9 inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, 23.8 inches.

Smokeless, 28.5 inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, 21.2 inches.

Smokeless, 25.5 inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, 19.5 inches.

Smokeless, 23.5 inches.

Muzzle energy:

Brown, 28,426 foot-tons.

Smokeless, 36,671 foot-tons.

Muzzle preponderance, 2,700 pounds.

Rifling:

Number of grooves, 72.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 24 inches from muzzle, being uniform over the 24 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

12-INCH B. L. RIFLE, MODEL 1900.

(Price of rifle, \$43,451.)

The official names of parts, number, material, location, synonymous names, etc., for the 12-inch B. L. rifle, model 1900, are the same as for the 12-inch B. L. rifle, model 1895.

TELESCOPIC SIGHTS. •

One telescopic sight is furnished with each gun for use either on sight standard attached to carriage or on trunnions. (For description of telescopic-sight brackets for holding same, etc., see Handbook of Sights for Cannon, 1899.)

FUZES.

Fuzes used with projectiles for 12-inch breech-loading rifles are:

For shell detonating—

“High resistance base fuze, ‘A,’ Model 1900, F. A.”

PRIMERS.

Obturator, electric (screwed), double wire, model 1899, F. A.

Obturator, electric (screwed), single wire, model 1900, F. A.

Obturator, electric (new model), F. A.

Combination electric and friction, model 1900, F. A.

CLEANING MATERIAL.

For allowance of cleaning material, etc., per annum, see Supply Table, page 359 and 360.

SPARE PARTS FOR GUN.

The following spare parts are issued for 12-inch breech-loading rifle, model 1888, and modifications: .

		Price each.
Firing attachment, complete	1 per post	\$112. 00
Gas-check pad	1 for every 2 guns ..	8. 00
Front split ring	1 per post	15. 50
Rear split ring	do	15. 50
Small split ring	do	7. 75
Translating roller	do	23. 40
Tray latch, complete	1 for every 3 guns ..	42. 00
Tray-spring bolt	do	6. 20
Tray-spring bolt spring	1 per gun	1. 30
Tray-spring bolt shoe	1 for every 3 guns ..	2. 25
Tray-spring bolt-shoe screw	do .....	. 65
Tray-lock bolt	1 of each per post ..	6. 50
Tray-lock lever	do	5. 20
Tray-lock link	do	4. 50
Tray-lock link pin	do	1. 95
Tray-lock lever pivot	do	3. 30
Tray-lock pin	do	1. 50
Tray-lock pin nut	do	1. 30
Tray-lock pin-nut pin	do .....	. 50
Tray back-latch catch	do	6. 50
Rotating-crank lock bolt	do	3. 25
Rotating-crank lock spring	do .....	. 65
Rotating-crank lock washer	do .....	. 32
Rotating-crank lock handle	do	3. 25
Rotating-crank lock-handle pin	do .....	. 32
Vent cover	do	9. 10
Tray back latch	do	20. 00
Tray ball bearing	do	15. 00
Translating stud	1 per battery	21. 75
Translating crank	do	
Rotating, crank lock plate, upper	do	1. 75

		Price each.
Rotating, crank lock plate, lower.....	1 per battery	\$1. 75
Rotating, crank lock plate screws.....	1 set per battery....	.32
Hinge-pin oil-hole screws	2 per gun.....	.32
Breechblock oil-hole screws.....	do .....	.32

The following spare parts are issued for 12-inch breech-loading rifles, model 1895 and modifications:

		Price each.
Vent cover.....	1 per post	\$7. 00
Front split ring.....	do	15. 50
Rear split ring.....	do	15. 50
Small split ring.....	do	7. 80
Gas-check pad.....	1 for every 2 guns..	6. 50
Obturator washer.....	1 per post	25. 00
Tray ball bearing.....	do	23. 40
Tray latch	do	17. 50
Tray-latch spring.....	1 per gun .....	.65
Tray-latch lock bolt.....	1 for every 2 guns..	1. 50
Tray-latch lock-bolt spring.....	1 per gun .....	.50
Tray-latch operating stud.....	1 for every 2 guns..	.50
Thrust bearings for worm shaft.....	2 per post	7. 50
Firing attachment, complete.....	1 per post	112. 00
Hinge-pin oil-hole screws	2 per gun .....	.65
Breechblock oil-hole screws	do .....	.32

NOTE.—A set of spare parts as enumerated above should always be kept on hand at post.

In ordering spare parts always give the name of maker, model, and number of gun for which parts are required.

See note, page 43, relative to spare parts.

SUBCALIBER TUBES.

One-pounder subcaliber tubes are issued for use with 12-inch breech-loading rifles, one to each post having guns of this caliber mounted. The list of parts of tube and fixtures is as follows;

List of parts of subcaliber tubes and fixtures.

1 gun.	1 rear adapter.
1 adapter clamp wedge.	1 center support.
1 clamp-wedge screw.	1 front adapter.
1 thread clamp screw.	

ACCESSORIES AND SPARE PARTS FOR SUBCALIBER TUBE.

The following accessories and spare parts are furnished with each subcaliber tube for 12-inch breech-loading rifle:

1 hand extractor.	1 securing-screw wrench.
1 handspike.	1 adjusting wrench for model 1888.
1 bristle sponge.	1 adjusting wrench for model 1895.
1 sponge rod.	1 oil can.
1 locating gauge.	1 breech cover (or cover for entire tube).
1 clamping wrench (for both clamp screws).	1 muzzle cover (or cover for entire tube).
1 clip extractor.	1 vent cleaner.
1 obturating-spindle plate.	1 thread clamp screw.
2 securing screws.	1 storage chest.

Subcaliber tubes and fixtures, when not in use, should always be kept in the special storage chest issued for that purpose.

For more complete description of subcaliber tubes see pamphlet, "Directions for using, mounting, etc., of 1-pounder subcaliber tubes," issued by Ordnance Department, U. S. Army. (Price of subcaliber tube, accessories and spare parts complete, \$420.00.)

DECAPPING TOOLS.

There are issued to each post equipped with 12-inch breech-loading rifle one set of tools for decapping and cleaning 1-pounder subcaliber ammunition. These sets are termed "Decapping and cleaning sets for 1-pounder subcaliber ammunition," and are composed of the following:

	Price each.
1 decapping spindle	
1 decapping anvil	
1 cleaning brush	
Total.....	per set.. \$2.50

12-INCH BARBETTE CARRIAGES, MODEL 1892.

(Price of carriage, \$12,000.)

Weights of principal parts—Carriages Nos. 1 to 4.

Name of part.	Number of pieces.	Weight.
		<i>Pounds.</i>
Top carriage	1	16,670
Chassis cheeks	2	24,250
Upper roller path	1	17,200
Bearing for traversing worm	1	110
Dust guard	1	296
Pinile cover	1	112
Lower roller path	1	34,120
Graduated training circle	1	28
Bracket for index plate	1	4
Index plate	1	0.75
Distance rings	2	330
Conical rollers	24	3,432
Braces (separators)	12	144
Elevating apparatus:		
Rack	1	180
Pinion	1	17
Pinion shaft	1	35
Worm wheel	1	91
Worm	1	80
Worm shaft	1	42
Mitters	2	30
Miter shaft	1	125
Spiral wheels	2	92
Shaft for spiral wheel	1	150
Handwheels	2	140
Friction clamp	1	16
Stuffing boxes	2	440
Rear cylinder heads	2	432
Throttling bars	4	160
Piston rods and heads	2	378
Piston-rod nuts	4	50
Recoil rollers	18	4,716
Roller journals	18	504
Guide hooks (clips)	4	1,304
Buffer brackets	2	282
Buffers (complete)	2	228
Traversing apparatus:		
Pinion	1	141
Pinion shaft	1	90
Worm wheel	1	360
Worm	1	58
Worm shaft	1	143
Crank	2	42
Holisting apparatus:		
Crane	1	425
Block	1	24

Weights of principal parts—Carriages Nos. 1 to 4—Continued.

Name of part.	Number of pieces.	Weight.
Hoisting apparatus—Continued.		<i>Pounds.</i>
Drum	1	122
Drum shaft	1	24
Pinion	1	26
Pinion shaft	1	22
Crank	1	21
Loading platform (complete)	1	2,995
Sliding platform (with connection)	1	638
Elevation indicator (complete)	1	30
Bolts, nuts		1,507
Total	139	112,804.76

Names of the parts of the 12-inch barbette carriage, model 1892, with their location and the material of which they are made.

[Parts marked * are of different shapes, depending on whether they belong to carriage No. 1 or 4, or after No. 4. Parts used only for certain carriages are marked with a special note.]

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				<i>Ins.</i>	<i>Ins.</i>		
Azimuth circle	On base ring (lower roller path).	Brass	1				In six sections.
Azimuth pointer (index plate).	On azimuth-pointer bracket.	.....do	1				With two 0.125" dowels.
Azimuth-pointer bracket.	Bolted to clip	Wrought iron.	1				
Ball-bearing balls.	Between washers	Steel, hardened.	92	.25			
Ball-bearing cover.	Over ball-bearing washer	Brass	2				
Ball-bearing washer.	Elevating worm shaft...	Steel, hardened.	4				Top and bottom part.
Base ring (lower roller path).	On platform	Gun iron	1				
Bearing for elevating shaft.	Bolted to top carriage...	Cast steel	1				
Bolts (countersunk head).	Guide for sliding plate to platform.	Wrought iron.	20	.75	2.875	20	
Do	Platform plate to cheeks.	.....do	20	.75	1.875	20	
Bolts (hexagonal head).	Bearing for elevating shaft to top carriage.	Steel	5	1.25	8		Tap bolt.
Do	Bearing for traversing pinion to racer.	.....do	4	1	2		Do.
Do	Bracket for azimuth pointer to clip.	Wrought iron.	2	.5	1.25		Do.
Do	Bracket for sliding-plate connection to T. C.	.....do	4	1.25	2.75		Do.
Do	do	Steel	4	1.5	3.5		Do.
Do	Buffer bracket to chassis.	.....do	1	2	5		Do.
Do	Chassis to racer.	.....do	36	1.75	6.625	36	Carriages after No. 4.
Do	do .....	.....do	8	1.75	4.5		Tap bolt. Carriages after No. 4.
Do	do .....	.....do	36	1.75	7.875	36	Carriages Nos. 1 to 4, inclusive.
Do	do .....	.....do	8	1.75	5.75		Tap bolt. Carriages Nos. 1 to 4, inclusive.
Do	Cheeks to chassis .....	.....do	4	1	2.25		Tap bolt. Carriages after No. 4.
Do	do .....	.....do	8	.875	2.125		Do.
Do	Cheeks to extension (loading platform).	.....do	4	.875	1.625		Tap bolt. Carriages Nos. 1 to 4, inclusive.
Do	do .....	.....do	32	.75	1.6		Do.
Do	do .....	.....do	4	1.25	3.875	4	Carriages Nos. 1 to 4, inclusive.
Do	Clip (guide hook) to racer.	.....do	20	2	5.5		Tap bolt, 2.75" across the flats.

Names of the parts of the 12-inch barbette carriage, model 1892, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Notes.	Remarks.
Bolts (hexagonal head.)	Crane bracket to cheek.	Steel.....	8	Inch. 1.5	Inch. 5	...	Tap bolt. Carriages Nos. 1 to 4, inclusive.
Do.....	Elevating rack to gun.	do.....	2	1.25	4.75	...	Tap bolt.
Do.....	Extension to chassis (loading platform).	do.....	16	.75	2	...	Tap bolt. Carriages after No. 4.
Do.....	do.....	do.....	4	.875	2.125	...	Tap bolt. Carriages Nos. 1 to 4, inclusive.
Do.....	do.....	do.....	28	.75	2	...	Do.
Do.....	do.....	do.....	4	.75	2.875	4	Carriages Nos. 1 to 4, inclusive. Standing bolts.
Do.....	do.....	do.....	8	1.125	3.375	...	Tap bolt. Carriages Nos. 1 to 4, inclusive.
Do.....	Pintle cover to racer.	Wrought iron.	12	.625	.9375	...	Tap bolt.
Do.....	Bracket for platform plate to cheek.	Steel.....	8	.625	2.75	8	Carriages after No. 4.
Do.....	do.....	do.....	16	.75	2.75	16	Do.
Do.....	Platform for trunnion sight to racer.	Wrought iron.	4	.625	.875	...	Tap bolt.
Do.....	Racer steps to racer.	Steel.....	8	1	1.5	...	Do.
Do.....	Railing to platform.	Wrought iron.	52	.625	1.125	...	Do.
Do.....	Retraction hook to top carriage.	Steel.....	2	1.125	3	...	Do.
Do.....	do.....	do.....	2	1	3	...	Do.
Do.....	Retraction shaft and worm brackets.	do.....	8	1	3	...	Do.
Do.....	Retraction worm-shaft bracket.	do.....	2	1	2.75	...	Do.
Do.....	Retraction worm wheel.	do.....	6	.75	1.5	...	Do.
Do.....	Sighting handles to top carriage.	do.....	8	1	2	...	Do.
Do.....	Standard for chassis sight, right chassis.	Wrought iron.	4	.75	1.75	...	Do.
Do.....	Throttling-bar bolts.	Steel.....	36	.75	3.125	...	Tap bolt, copper washer.
Do.....	Trunnion cap to top carriage.	do.....	4	1.5	4.25	...	Tap bolt.
Do.....	Worm-wheel bracket cover.	do.....	8	.375	.75	...	Do.
Bolts (round head)	Braces to roller frame (distance rings).	do.....	12	1	16.75	12	Smooth forgings.
Do.....	Elevating rack to gun.	do.....	2	1.25	3.375	over all	
Bolts (square head)	Buffer bracket to chassis.	do.....	3	2	7.125	3	
Do.....	Bracket for platform-plate cheeks.	Wrought iron.	16	.75	2	16	Carriages after No. 4.
Do.....	End braces to platform.	do.....	8	.625	1.75	8	
Do.....	do.....	do.....	4	.625	2.25	4	
Do.....	Platform plate to cheeks.	do.....	8	.625	2	8	
Do.....	do.....	do.....	18	.625	1.75	18	
Do.....	Step braces to platform.	do.....	8	.75	1.675	8	
Do.....	do.....	do.....	8	.75	2.875	8	
Braces.	Between inner and outer distance rings.	Cast iron.....	12	2.05	13.19	...	
Brackets for chassis sight.	Bolted to right chassis.	Bronze.....	1	...	...	...
Bracket for platform plate.	Bolted to platform plate and cheeks.	Cast iron.....	4	...	...	...	Do.
Bracket for retraction drum shaft.	Bolted to racer.	do.....	1	...	...	...
Bracket for retraction worm wheel.	do.....	do.....	1	...	...	...
Bracket for retraction worm shaft.	do.....	do.....	1	...	...	...
Bracket for traversing crank shaft.	do.....	Cast steel.....	1	...	...	...
Buffer, counter-recoil (female).	In rear cylinder head.	Bronze.....	2	...	...	...
Buffer, counter-recoil (male).	Screwed into piston rod.	Forged steel..	2	...	...	...
Buffer brackets....	Bolted to chassis.	Cast steel, No. 2.	2	...	...	...

Names of the parts of the 18-inch barbette carriage, model 1892, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Buffer brackets....	Bolted to buffer bracket.	Forged steel..	2	Inch.	Inch.		Rubber cylinder 6" in diameter and 4" long; 4 nuts.
Bushings.....	Chassis.....	Bronze.....	3				
Do.....	Elevating hand wheel shaft.	do.....	2				8 countersunk screws.
Do.....	Recoil rollers.....	do.....	18				
Do.....	Retraction crank shaft..	do.....	2				
Do.....	Traversing crank shaft..	do.....	2				Do.
Do.....	Trunnion bed top carriages.	do.....	2				
* Chassis.....	Bolted to racer.....	Cast steel, No. 1.	2				Right and left.
Cheek plate.....	Bolted to cheek extension.	Steel.....	2				Carriages Nos. 1 to 4, inclusive.
Cheek extension..	Bolted to chassis.....	Gun iron.....	2				Carriages Nos. 1 to 4, inclusive, right and left.
Cheek plate.....	do.....	Steel.....	2				Carriages after No. 4.
Clip (guide hook)..	Bolted to racer.....	Cast steel, No. 1.	4				
Collar.....	Elevating worm shaft..	Steel.....	1				Taper pin.
Do.....	Retraction worm shaft..	do.....	1				Set screw.
Do.....	Retraction crank shaft..	do.....	1				Do.
Connecting rod....	Sliding plate to top carriage.	Wrought iron.	2				4 pins.
Connecting-rod bracket.	Bolted to top carriage..	do.....	2				Right and left 2 1/2" set screws.
Crane bracket.....	Bolted to left chassis....	Forged steel..	1				Carriages Nos. 1 to 4, inclusive.
Crane-block sheave	Between housings.....	Bronze.....	2				
Crane-block sheave journal.	Through housing and sheaves.	Wrought iron.	1				Split pin.
Crane-block hook..	On crane-block housing..	do.....	1				Nut and pin.
* Crane-block housing.	Form casing for sheaves.	do.....	1				Carriages after No. 4 have a guide.
Crane crank.....	On crank shaft.....	do.....	1				Wooden handle, nut, etc.
Crane-crank shaft.	Through cheek extension (left).	Forged steel..	1				Through chassis (left), carriages after No. 4.
Crane drum.....	On drum shaft.....	Bronze.....	1				
Crane-drum gear..	On drum.....	do.....	1				
Crane-drum pinion	On crane-crank shaft....	do.....	1				
Crane-drum shaft..	Through cheek extension (left).	Forged steel..	1				Do.
* Crane-guide sheave bracket.	On crane mast.....	Wrought iron.	2				
Crane-guide sheave	In guide sheave bracket.	Bronze.....	2				
Crane-guide sheave journal.	Through bracket and sheave.	Wrought iron.	2				A" split pin.
* Crane mast.....	Rear of left chassis.....	do.....	1				Carriages Nos. 1 to 4, inclusive; stop bolt and screw eye.
Crane-ratchet pawl	On cheek extension.....	do.....	1				Screw eye, chain and pin; carriages after No. 4, on chassis.
Crane-ratchet wheel.	On crank shaft.....	Bronze.....	1				Key.
Crane rope.....	For crane.....	Manilla.....	1				72 feet 2" rope.
Crane sheave.....	In housing on crane mast.	Bronze.....	2				
Crane-sheave journal.	Through housing and sheaves.	Wrought iron.	1				1/2" split pin.
Rear cylinder head	Screwed into rear of recoil cylinder.	Cast steel.....	2				Fiber gasket between head and cylinder.

Names of the parts of the 12-inch barbette carriage, model 1892, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Direction plate (elevate and depress).	On chassis.....	Bronze	2	Ina.	Ina.		6 screws.
Direction plate (right and left).	.....do .....	.....do	2				Do.
Distance ring.....	Traversing rollers (inner).	Wrought iron.	1				
Do.....	Traversing rollers (outer).	.....do	1				
Dust guard.....	Bolted to racer	Sheet steel....	1				
Elevating hand-wheel.	Elevating handwheel shaft.	Bronze.....	2				
Elevating hand-wheel shaft.	Through front of chassis.	Forged steel..	1				$\frac{1}{8}$ " x $\frac{1}{4}$ " key, 2 washers and 2 nuts.
Elevating miter gear.	On elevating side and worm shafts.	Bronze and steel.	2				$\frac{1}{8}$ " x $\frac{1}{4}$ " key, 2 tap pins, 1 collar, 12 teeth, 1.5" pitch.
Elevating-miter gear collar.	On miter gear	Bronze	1				Taper pin.
Elevating pinion..	On worm-wheel shaft ..	Forged steel..	1				10 teeth, 2" pitch, $\frac{1}{8}$ " x $\frac{1}{4}$ " key.
Elevating rack....	Bolted to gun .....	.....do	1				17 teeth, 2" pitch.
Elevating side shaft.	Outside of right chassis.	.....do	1				$\frac{1}{8}$ " x $\frac{1}{4}$ " key, 2 washers, 4 nuts.
Elevating spiral wheel.	On elevating side and handwheel shafts.	One bronze and one iron.	2				$\frac{1}{8}$ " x $\frac{1}{4}$ " keys.
Elevating worm...	On elevating worm wheel.	Forged steel..	1		6		1.5" pitch, left-hand, 6.81" overall, 4.75" to top of thread.
Elevating worm shaft.	Through vertical bearings on top carriage.	.....do	1				Two $\frac{1}{8}$ " x $\frac{1}{4}$ " keys, collar, pin, and nut.
Elevating worm wheel.	On elevating worm-wheel shaft.	Bronze.....	1				33 teeth, 1.5" pitch.
Elevating worm-wheel shaft.	Through horizontal bearings on top carriage.	Forged steel....	1				$\frac{1}{8}$ " x $\frac{1}{4}$ " key and nut.
Elevation indicator arc.	Bolted to top carriage...	Bronze	1				
Elevation indicator pinion.	Studded to top-carriage cap.	.....do	1				18 teeth, $\frac{1}{4}$ " pitch.
Elevation indicator pointer.	On elevation-indicator stud.	.....do	1				
Elevation indicator scroll spring.	Attached to elevation-indicator pointer.	Spring steel....	1				Pin and lug.
Elevation indicator stud.	Top-carriage cap	Steel.....	1				Key, washer, and nut.
Elevation indicator wheel rack.	Bolted to trunnion of gun.	Bronze	1				
Elevation stop....	Bolted to top carriage...	Forged steel..	1				With nut.
End brace.....	On loading platform....	Steel.....	1				
Equalizing pipe...	On top carriage	Copper	1				Steel washer and fiber packing.
Equalizing-pipe nipple.	Screwed into top-carriage cylinders.	Steel.....	2				
Equalizing-pipe union.	Connects pipe and nipple.	Bronze	2				
Extractor (screw eye).	For gland	Wrought iron.	2				
Friction clamp....	On worm-wheel shaft....	Forged steel..	1				
Guide hook (clip).	Bolted to racer	Cast steel, No. 1	4				
Guide for sliding plate.	Bolted to loading platform.	Bronze	2				
Index plate (aiming pointer).	On index plate bracket..	Brass	1				Two $\frac{1}{4}$ " dowels.
Implement box....	One with each carriage..	Ash.....	1				
* Loading platform	Bolted to check extension.	Steel.....	1				Carriages after No. 4 bolted to rear of chassis.
Name plate.....	On right chassis.....	Bronze	1				
Oil cans	In implement box.....	Brass	2				$\frac{1}{4}$ pint, 1 qt., with valve.
Oil plugs	For all oil holes .....	.....do					
Piston head	Screwed on piston rod...	Forged steel..	2				

Names of the parts of the 18-inch barbette carriage, model 1892, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inch.	Inch.		
Piston-head cover.	Covers piston head.....	Bronze.....	2				
Piston rod.....	In recoil cylinders.....	Forged steel.....	2				
Piston-rod nuts.....	On piston rod.....	Steel.....	4				
Platform for chassis sight.	Riveted to loading platform.	Sheet steel.....	1				
Plugs for filling and drainholes.	On top carriage.....	Steel.....	6	1.25	1.5		Copper washers.
Racer (upper roller path).	On traverse rollers.....	Cast steel.....	1				
Railing.....	On loading platform.....	Wrought iron.....	1				
Retraction-block cheeks.	Forms housing for sheaves.....	Steel.....	14				
Retraction-block elevia.	On retraction block.....	do.....	6				
Retraction-block pins.	Through elevia and separators.....	do.....	8				With nuts.
Retraction-block separators.	Between cheeks.....	do.....	10				
Retraction-block sheave.	In retraction block.....	Bronze, No. 3.....	10				
Retraction-block sheave journal.	Through sheaves.....	Steel.....	4				With nuts.
Retraction-crank shaft.	Through chassis.....	do.....	1				0.5" sq. key, collar, and set screw.
Retraction drum.	On retraction-drum shaft.....	Bronze.....	2				
Retraction-drum shaft.	Through chassis.....	Steel.....	1				Two 1" sq. key and two 1" splinescrews.
Retraction hooks.	Bolted to chassis and top carriage.	Cast steel, No. 2.....	4				
Retraction-miter gear.	On retraction crank and worm shafts.	Steel.....	2				24 teeth, 4" pitch, 1" sq. keys and 1" set screws.
Retraction worm.	On worm shaft.....	Steel, No. 3.....	1		7		1" sq. key, triple R. H. thread, 2" lead, 2.72" P. D.
Retraction-worm shaft.	Outside of left chassis.....	do.....	1				2 keys, collar, and setscrew.
Retraction-worm wheel.	On worm-wheel shaft.....	Bronze.....	1				72 teeth, 15.25" P. D., triple R. H. worm, 1" cir. pitch.
Roller path, upper (racer).	On traverse rollers.....	Cast steel.....	1				
Roller path, lower (base ring).	On platform.....	Gun iron.....	1				
Rollers, recoil.....	In pockets on chassis.....	Forged steel.....	18				
Rollers, recoil journal.	Through recoil rollers.....	do.....	18				
Rollers, traversing.	On base ring.....	do.....	24				
Screws (counter-sunk).	Axis (training) circle.....	Brass.....	48	.25	.375		
Do.....	Bushing for elevating crank shaft.....	Steel.....	8	.5	1.25		
Do.....	Bushing for traversing crank shaft.....	do.....	8	.5	1.25		
Do.....	Filling piece dust guard to racer.....	do.....	33	1	8.5		Carriages Nos. 1 to 4, inclusive.
Do.....	do.....	do.....	17	1	8.5		Carriages after No. 4.
Do.....	Guides sliding plate to platform.....	do.....	22	.3125	.75		
Do.....	Lining lateral bearing top carriage.....	Tubin bronze.....	100	.3125	.9375		
Do.....	Piston cover.....	Brass.....	32	.3125	.875		
Do.....	Stop to chassis.....	Wrought iron.....	6	.75	1.5		
Do.....	Traversing bevel gear cover.....	Steel.....	4	.5	over all		
Screws (headless).	Retraction drum.....	do.....	2	.75	1		
Do.....	Retraction miter gear and shaft collar.....	do.....	3	.625	.875		
Do.....	Retraction-worm shaft collar.....	do.....	1	.5	.75		

Names of the parts of the 18-inch barbette carriage, model 1898, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Screws (hexagonal head).....	Sliding plate connection.	Steel.....	4	<i>Inch.</i> 0.5	<i>Inch.</i> 1.25	...	Set screws.
Do.....	Leveling screws in base ring.	Bronze, No. 3.	8	2.25	5	...	
Screws (round head).....	Azimuth pointer (index plate).	Brass.....	2	.375	.7	...	
Do.....	Dust guard to racer.....	Steel.....	60	.375	.9	...	
Screw-driver.....	For dust guard.....	Wrought iron.	1			...	
Do.....	For elevating rack.....	Forged steel..	1			...	
Do.....	For recoil roller journals.	Wrought iron.	1			...	
Do.....	For general use.....	Steel, hardened.	1			...	With wooden handle.
Sighting handles.....	Bolted to top carriage.....	Wrought iron	2			...	
Sighting platform.....	Bolted to racer.....	do.....	1			...	
Sliding plate.....	On loading platform.....	Steel.....	1			...	
Sliding-plate connection.	Bolted to sliding plate ..	Wrought iron	2			...	
Steps to loading platform.	On each side of loading platform.	Steel.....	2			sets	
Steps to racer.....	On each side of racer.....	do.....	2			sets	
Stop.....	On chassis.....	do.....	2				Carriages after No. 4.
Stuffing box.....	Screwed into front end of cylinder.	Bronze.....	2				Fiber gasket between box and cylinder.
Stuffing-box follower.	In stuffing box.....	do.....	2				
Stuffing-box gland.....	do.....	do.....	2				Garlock packing rings 1" sq. to be used.
Throttling bar.....	In recoil cylinders.....	Forged steel..	4				
Thrust plates.....	On platform under base ring.	Steel.....	8				
Top carriage.....	On recoil rollers.....	Cast steel, No. 2	1				
Top-carriage caps.....	On top carriage.....	do.....	2				
Training (azimuth circle).	On base ring.....	Brass.....	1				
Traversing bevel gear.	Studded to racer.....	Bronze.....	1				66 teeth, 1.875" pitch.
Traversing bevel pinion.	Traversing-crank shaft..	Forged steel..	1				11 teeth, 1.875" pitch.
Traversing crank.....	do.....	do.....	2				Handle with brass sleeve and nut.
Traversing-crank shaft.	Through chassis.....	do.....	1				0.875" x 0.4375" key.
Traversing-rack pinion.	On traversing-crank shaft.	Bronze.....	1				16 teeth, 2.5" pitch, 0.6" x 0.75" key.
Traversing-rack pinion shaft.	Through bearing on front of racer.	Forged steel..	1				Two 0.6" x 0.75" key and nut.
Traversing-spur gear.	On traversing-rack pinion shaft.	Bronze.....	1				45 teeth, 1.875" pitch.
Traversing-spur pinion.	On bevel gear.....	Forged steel..	1				Three 0.5" pins.
Washers.....	For crane-crank shaft...	Steel.....	1				
Do.....	For elevating hand-wheel shaft.	do.....	2				
Do.....	For elevating side shaft.	do.....	2				
Wheel.....	Handwheel for elevating apparatus.	Bronze.....	2				
Worm-wheel bracket cover.	On retraction worm-wheel bracket.	Steel.....	1				
Wrench.....	For stuffing-box gland ..	Forged steel..	1				
Do.....	For piston-rod nuts.....	Steel.....	1				
Wrench box.....	For cylinder head.....	Forged steel..	1				
Do.....	For friction clamp.....	do.....	1				
Do.....	For guide hook (clip).....	Wrought iron.	1				
Do.....	For elevating rack.....	do.....	1				
Wrench, double.....	For 1" and 1 1/2" nuts.....	Steel.....	1				
Do.....	For loading platform and throttling bar.	Forged steel..	1				
Do.....	For elevating apparatus.	do.....	1				
Wrench, single.....	For 1" nuts.....	Steel.....	1				
Do.....	For 1 1/2" nuts.....	do.....	1				
Do.....	For 1 1/2" nuts.....	do.....	1				
Do.....	For 2" nuts.....	do.....	1				
Do.....	For scroll spring.....	do.....	1				

Names of the parts of the 12-inch barbette carriage, model 1892, etc.—Continued.

AMMUNITION TRUCKS.

(Price of ammunition truck separately, each \$86.62.)

(Price of shot tongs each, \$12.89.)

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Axle.....	For ammunition truck..	Forged steel..	1	<i>Ins.</i>	<i>Ins.</i>		
Bottom strips.....	Riveted to end and centerpiece.	Steel plate....	2				
Bracket.....	For guard wheel.....	Cast steel.....	2				Key.
Bushing.....	In guard-wheel bracket.	Bronze.....	2				
Centerpiece.....	Riveted to side frame..	Steel.....	1				
Collar.....	On truck axle.....	Forged steel..	2				Taper pins and packing.
Draw handle.....	On side frame.....	do.....	2				
Handle.....	On rear of side frame...	Ash.....	1				
Hangers.....	Riveted to side frame and collar.	Steel.....	4				
Journal.....	For guard wheel.....	do.....	2				
Lock rings.....	On guard-wheel journal.	do.....	4				
Nuts.....	On axle.....	Forged steel..	2				Packing.
Oil plugs.....	For all oil holes.....	Brass.....	2				
Pin.....	Through stops in shot tray.	Steel.....	1				Two $\frac{1}{2}$ " split pins.
Roller bearings.....	On axle.....	Steel and brass	2				
Shot pans.....	Riveted to hangers.....	Steel.....	1				
Shot tray.....	On shot pan.....	Wrought iron.	1				
Side frame.....	Supported by hangers..	Steel.....	2				
Springs.....	For stops on tray.....	Steel wire.....	2				
Stop.....	On shot tray.....	Bronze.....	2				
Wheel (guard).....	On front and rear of truck.	Cast steel.....	2				
Wheel (truck).....	On axle.....	do.....	2				

AMMUNITION TRUCKS TO BE USED WITH CHAIN AMMUNITION HOLSTS.

Axle.....	For ammunition truck..	Forged steel..	1				
Cartridge pan.....	On support.....	Steel.....	2				
Caster.....	In caster bracket.....	Cast steel.....	1				
Caster bracket.....	Rivited to truck frame..	Bronze.....	2				
Caster wheel.....	In caster.....	Cast steel.....	1				
Caster-wheel journal.	Through caster and wheel.	Forged steel..	1				Split pins.
Collar.....	Pinned to caster.....	do.....	1				Taper pin.
Do.....	On axle.....	do.....	1				2 taper pins.
Frame.....	For truck.....	Steel.....	1				Riveted together.
Framing collar....	Riveted to truck frame..	Forged steel..	2				2 taper pins.
Handle.....	Rear of top frame.....	Ash.....	1				2 pins riveted at both ends.
Oil plugs.....	For all oil holes.....	Brass.....	2				With felt packing.
Roller bearings.....	On axle.....	Steel and brass	2				Do.
Do.....	Caster-wheel journal....	do.....	1				
Shot tray.....	Rivited to frame.....	Steel plate....	a 2				
Support.....	do.....	Steel.....	2				
Washer.....	On hub of caster wheel..	Bronze.....	2				
Do.....	On hub of truck wheel..	do.....	4				
Wheels (truck)....	On axle.....	Cast steel.....	2				

^a Two pieces.

12-INCH DISAPPEARING CARRIAGE, L. F., MODEL 1898.

(Price of carriage, \$39,906.31.)

Weights of principal parts.

Name of part.	No. of pieces.	Weight.
		<i>Pounds.</i>
Base ring, including rack	1	34,290
Traversing rollers	24	6,720
Distance rings with fish plates and bolts	2	2,200
Racer	1	27,987
Dust guard in four sections and screws	1	668
Chassis with elevating rack guides	2	45,845
Recoil rollers with bronze bushing	18	4,320
Roller axles and bushings	18	675
Top carriage with piston rods, liners, stuffing boxes, throttling bars, and bolts ..	1	25,500
Gun lever arms with axle, yoke, cap squares, and bushings	2	28,626
Front transom	1	3,940
Rear transom	1	2,460
Elevating arm and boxes	1	8,180
Elevating band	1	1,905
Buffer brackets with caps, fillers, etc.	2	2,696
Elevating racks	2	1,400
Sight standard	1	504
Ladder standard	1	215
Piston-rod brackets	2	815
Sighting platform	1	289
Outside working platforms with steps, bolts ..	2	1,060
Inside working platform angles and bolts ..	2	800
Top-carriage platform and post	1	169
Top-carriage platform base	1	74
Retracting chains	2	870
Retracting-chain drums	2	480
Retracting crank shaft, collars, and wheel ..	1	542
Retracting drum shaft and keys	1	855
Drum gear	1	638
Gear wheel and second pinion for retracting ..	1	272
Retracting cranks	2	135
First pinion for retracting	1	38
Gear-wheel and third pinion for retracting ..	1	477
Handwheels for retracting shaft	2	48
Rear ladders	1 pair.	280
Side ladders	2	170
Ladders for top carriage	1 pair.	180
Straps and bolts for rear ladder	8	67
Steps for outside platform	2	75
Steps for top carriage	2	87
Traversing intermediate bracket with shaft, bevel gear, pinion, and collar	1	471
Traversing shaft with three collars and pinion ..	1	151
Traversing pinion shaft, bracket, pinion, and roller bearings ..	1	665
Traversing cranks	2	59
Pawl levers	2	900
Pawl-lever crank shaft	1	161
Tripping levers	2	141
Elevating shaft with collars and pinion	1	158
Elevation circle	1	94
Elevating handwheels	2	240
Elevating rack pinions	2	307
Worm-wheel case, worm and worm wheel, friction disks, etc.	1	1,315
Elevating pinion shaft, collars, keys, and nuts ..	1	890
Chassis to racer, 40 bolts, 4 dowels, and 4 keys ..	48	459
Bolts for transoms to chassis	50	413
Bolts for buffer brackets	8	143
Studs, bolts, and keys for racer together		215
Roller bearings, bushings, and oil plugs		441
Carriage		201,266
Counterweight cage and liners	1	17,694
Pins and keys for counterweight cage	2	816
Lead weights, including two auxiliary weights ..	28	133,780
Lead weights, detachable	54	5,404
		157,694
Ammunition trucks (3), 1,150 pounds each ..		3,450
Implements		465
Total weight of carriage		302,875

List of the parts of carriage, location, material, correct nomenclature, etc.

Name of part.	Location.	Material.	Number.	Diameter or width.	Length.	Nuts.	Remarks.
Asimuth circle....	Base ring.....	Brass.....	1	Inch. 16.75	Inch.		In pieces.
Asimuth pointer...	On racer.....	do.....	1	6.5	4.05		Two 0.375 dowel pins.
Asimuth-pointer cover.	do.....	Bronze.....	1	10.6	12.15		Hinged.
Angle straps.....	At chain guides.....	Wrought iron..	4	2			
Adjusting keys.....	In sight standard.....	Steel.....	2		7.5		
Adjusting loops.....	At ends of retracting chains.	Wrought iron..	2		17 to 20		With 2 screws and 4 nuts.
Angle irons.....	Securing inside and outside working platforms.	Steel.....	12	2.5	4.5		
Do.....	Inside working platforms to chassis.	do.....	2	5	8		
Bolts, through.....	At racer joints.....	Wrought iron..	6	2	9.5	6	
Do.....	do.....	do.....	2	2.5	10	2	
Bolts, headless.....	do.....	do.....	2	2.5	12.5	4	
Bolts, key.....	do.....	do.....	2	2.5	22.5	0	
Bolts, tap.....	At traversing stops.....	do.....	4	1.75	4.875	0	
Bolts, through.....	At joints of base.....	do.....	6	2.5	10	6	
Do.....	do.....	do.....	6	2	9.5	6	
Do.....	Sight-standard caps.....	do.....	4	.625	2.75	4	
Bolts, tap.....	Dust guard to racer.....	do.....	64	.625	1	0	
Do.....	Dust-guard joints.....	do.....	32	.625	.75	0	
Do.....	Roller caps.....	do.....	16	.625	1.5		
Bolts, through, countersunk head.	At distance ring joints.....	do.....	32	1	4	32	32 Verona washers.
Do.....	At distance ring separators.	do.....	66	1	5.25	66	66 Verona washers.
Brace.....	To top-carriage platform.	Forged steel..	1	1	47		
Brace pin.....	To snap hook of top-carriage platform brace onto.	do.....	1	2	6		
Brace hinge pin...	Brace to platform post..	do.....	1	1.5	4.25		With 2 split pins 0.375 x 2.
Buffers.....	At elevating rack.....	do.....	2	2.19	30.5	2	
Buffer caps.....	At recoil buffers.....	Wrought iron..	2	10	18		
Buffer fillers.....	do.....	Balata.....	16	9	17		
Buffer plates.....	do.....	Wrought iron..	14	10	18		
Buffer brackets.....	do.....	Cast steel, No. 1.	2	18	30		1 right hand; 1 left hand.
Buffer, counter-recoil.	Top carriage, rear head..	Bronze, No. 3..	2	7.5	6		
Buffer brackets.....	At elevating-rack buffers.	Forged steel..	2	4	8	2	
Buffer springs.....	do.....	Round steel..	2	3.75	18.5		
Bushings.....	In recoil rollers.....	Bronze.....	18	3.754	8		
Do.....	In chassis for forward 4 recoil rollers.	Forged steel..	4	4.4, 5	2.5		
Bushings, pawl shaft.	In chassis.....	Bronze.....	2	8	8.25		
Bushings.....	In top carriage, at gun-lever axle bed.	do.....	2	14.5	13		In 4 halves.
Do.....	In gun levers, upper ends.	do.....	2	16	8		Do.
Do.....	In gun levers, lower ends.	do.....	2	11.5	8		
Do.....	Elevating arms, lower ends.	do.....	2	7.5	4.25		
Do.....	In worm-wheel case.....	do.....	1	2.25	3.5		
Bushings, flanged.	Center worm-wheel case.	do.....	2	8.25	8.5		4 halves.
Bushings.....	In traversing intermediate bracket.	Forged steel..	2	4.25	4.75		
Do.....	At drum-shaft bearings..	do.....	2	7	10.25		
Do.....	At elevating pinion-shaft bearings.	do.....	2	6	10.125		
Do.....	At retracting crank-shaft bearings.	do.....	2	5.5	10.125		
Button.....	In worm-wheel case.....	Bronze.....	1	1.75	.5		
Caps, roller.....	Under distance ring.....	Wrought iron..	8	1.25	5		
Caps.....	Elevating arms, upper end.	Forged steel, No. 3.	2	3.5	19.75		
Caps, gun-lever axle.	On top carriage.....	do.....	2	13	34		
Capsquares.....	Upper end gun levers..	do.....	2	8	37.5		
Chain fasteners.....	On retracting drums.....	Wrought iron..	2	2	11.5		
Chain guides.....	Conducting retracting chains to drums.	Sheet steel....	2	11.5	93		
Chain-sheave pins.	In buffer brackets.....	Forged steel, No. 2.	2	2.5	11		
Chain sheaves.....	do.....	Cast steel.....	2	14.16			

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter or width.	Length.	Nuts.	Remarks.
Chassis	On racer	Cast iron, No. 2.	2	Ina. 17.12	Ina. 21.88 ^a	...	1 right hand; 1 left hand.
Collars	On equalizing pipes	Brass	4	1.5	...	...	With felt washer and taper pins.
Do	On elevating shaft	Steel	4	4.45	2	...	Do.
Do	On elevating-pinion shaft	do	1	4.2	2	...	Do.
Do	On intermediate traversing shaft	do	2	4.86	2	...	Do.
Do	On traversing shaft	do	3	4.45	2	...	Do.
Do	On drum-shaft ends	do	2	5.45	2.5	...	Do.
Do	On drum-shaft middle	do	1	10	2.25	...	With felt washer and set screw.
Do	On retracting-crank shaft	do	1	5.375	3.25	...	With felt washer and taper pin.
Do	do	do	1	8.125	2.5	...	With felt washer and set screw.
Collars, crank pin.	Tripping gear	do	2	2	1	...	With driven pins.
Counterweight	Piled in cage	Lead	8	...	...	...	First layer.
Do	do	do	8	...	...	...	Second, third, fourth, and fifth layers.
Do	do	do	8	...	...	...	Sixth and seventh layers.
Do	do	do	2	...	...	...	Eighth layer.
Do	do	do	64	...	...	...	Ninth layer.
Do	do	do	2	...	...	...	Auxiliary under ninth layer.
Coupling, emptying.	Equalizing pipe	Bronze	1	2.25	4.125	...	...
Coupling plug	Emptying coupling	do	1	.75	...	...	...
Coupling rings	Equalizing pipe	Steel	4	1.5	...	...	...
Coupling followers	do	Bronze	4	1.625	1.5	...	...
Coupling straps	Emptying coupling to top carriage.	Wrought iron	2	1	...	...	...
Crank pins	Pawl lever cranks, tripping gear.	Forged steel, No. 8.	2	1	5.625	2	...
Crosshead and counterweight cage.	At lower end of gun levers.	Cast steel, No. 1	...	79.3	132	...	...
Crosshead ribs	In crosshead	Tobin bronze	4	3	60	...	...
Crosshead liners	do	do	6	...	60	...	2 wide; 4 narrow.
Crosshead pins	Connecting crosshead to gun lever.	Forged steel, No. 2.	2	10	18.5	...	...
Direction plates	For elevating, on chassis	Brass	2	1.75	...	...	1 right hand; 1 left hand.
Do	For retracting, on chassis	do	2	1.75	...	...	Do.
Do	For traversing, on chassis	do	2	1.75	...	...	Do.
Distance ring	Traversing roller inner ring.	Wrought iron	1	177.25	...	...	In halves.
Do	Traversing roller outer ring.	do	1	206.75	...	...	Do.
Drum shaft	Through middle of chassis.	Forged steel, No. 2.	1	6.875	92	...	...
Dust guard	Around racer	Wrought iron	1	211.5	...	...	In 4 pieces.
Elevating arm	Elevating band to elevating racks.	Cast steel, No. 1	1	64.5	185	...	...
Elevating band	On breech of gun	do	1	46.2	...	...	...
Elevating hand-wheels.	Elevating hand-wheel shaft.	Wrought iron	2	...	...	...	Rim, spokes, and hub.
Elevating rack guides.	Elevating racks to chassis.	Cast steel, No. 1	4	...	75	...	2 right hand; 2 left hand.
Elevating racks	At foot of elevating arm.	do	2	12	62	...	1 right; 1 left.
Elevating shaft	Through chassis	Forged steel	1	2.125	129	...	...
Elevating worm	Elevating gear	do	1	5.53	22.625	...	...
Elevating worm wheel.	do	Bronze, No. 3	1	26.53	...	...	...
Elevating worm-wheel case.	do	Cast iron, No. 2.	1	80.25	...	...	...
Elevating pinions	do	Bronze, No. 3	2	15.044	...	...	25 teeth.
Elevating pinion shaft.	do	Forged steel, No. 2.	1	5	93	...	...

^a Feet.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter or width.	Length.	Nuts.	Remarks.
Elevation circle	Elevating gear	Bronze	1	<i>In.</i> 24	<i>In.</i>		With taper pin.
Elevation pointer	do	do	1	6			Two 0.25 dowel pins.
Eye screws	Cap squares and axle caps.	Forged steel	4	1.5			0.875-inch thread.
Filling and vent tubes.	Top carriage cylinders	Steel	4	1.75			2 long; 2 short.
Foot plates	On top carriage	do	2	12			
Fish plates	At dust-guard joints	Wrought iron	4	4.5	10.5		
Do	At distance-ring joints	do	4	7			
Friction disks	On elevating-pinion shaft	Cast iron, No. 2	2	22.75			
Gaskets.	At equalizing pipe	Leather	4	1.5			
Do	At recoil cylinders	do	2	10.5			Front end.
Do	do	do	2	19			Rear end.
Gland	Cylinder stuffing boxes	Bronze	4				Front and rear.
Gland rings	do	Forged steel	4				Front and rear; 8 halves.
Gun levers	Carrying gun	Cast steel, No. 1	2	40	210		
Gun-lever axle	Carrying-gun levers	Forged steel, No. 3	1		93.25		
Handles	To ladders on gun levers	Wrought iron	2	1.25	74		
Do	To counterweights	Steel	64	.5			
Keys	Gun levers to axle	do	2	2.5	10		
Do	At crosshead pins	Forged steel	2	4	15		
Do	Elevating handwheels to shaft	Steel	2	.5	4.5		Staked in.
Do	In elevating gear miters	do	2	.625	8		
Do	Friction disks to shaft	do	2	1	11		Do.
Do	Elevating circle to pinion shaft	do	1	.5	3.5		
Do	Bevel gear to traversing-pinion shaft	do	1	.75	3.375		
Do	Traversing pinion to shaft	do	1	.75	3.5		
Do	Gear wheels to traversing intermediate shaft	do	2	.625	3.25		
Do	Bevel pinion to traversing shaft	do	1	.625	4.2		
Do	Cranks to traversing shaft	do	2	.5	4.5		
Do	Gear wheel to second pinion, retracting gear	do	2	1	2.75		
Do	Gear wheel to third pinion, retracting gear	do	2	1.25	4.25		
Do	First pinion to shaft, retracting gear	do	1	.75	3		
Keys, gib	Pawl wheel to retracting-pinion shaft	do	1	.75	5		
Do	Handwheels to retracting-pinion shaft	do	2	.625	4		
Do	Retracting drums to shaft	do	4	1.5	4.75		2 in each drum.
Do	Drum gear to shaft	do	2	1.5	7.25		
Do	Tripping-gear cranks	do	2	.625	6		
Keys	Between chassis and racer	do	4	2.5	15		
Do	In recoil-roller axles	do	18	.5	2		
Do	At recoil-buffer brackets	do	4	2.5	18		
Do	At base of ladder standard	do	1	.75	7		
Do	Pawl shaft	do	2	.625	4.5		Staked in.
Keys, joint	At racer joints	do	2	2.5	34		
Do	At joints of base	do	2	2.5	37		
Ladder brace	At pit ladder	do	2		65		
Ladder, pit	Racer platform to pit	do	1		81		
Ladder, rear	At rear of chassis	do	2		158		1 right hand; 1 left hand.
Ladder, side	At sides of chassis	do	2		58.75		
Ladder, top carriage	At sides of top carriage	do	2		48		Do.
Ladder standard	Top of piston-rod bracket	Cast steel	1		91.5		Left side.
Liners	In top carriage	Tobin bronze	6		91		3 right; 3 left.
Do	In pistons, recoil cylinders	do	8		7		4 right; 4 left.
Do	On elevating racks	do	12		52		3 right; 3 left.
Lining	In recoil cylinders	Bronze, No. 2	2		77.5		Recent carriage use cast iron, No. 1.
Miter gears	Elevating gear	Bronze, No. 3	2		8.75		

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter or width.	Length.	Nuts.	Remarks.
Name plate.....	On right chassis.....	Bronze.....	1	<i>Ins.</i> 4	<i>Ins.</i> 6	...	
Nuts.....	At friction disks, on shaft	Steel.....	2	5	2.75	2	1 with taper pin; 1 with set screw.
Nuts, special.....	At each end traversing-pinion shaft.	.....do.....	2	2.44	1.125	2	
Oil plugs.....	In racer.....	Bronze.....	4	1	1.125	...	0.5-inch thread.
Do.....	At elevating shafts and sleeve nut.	.....do.....	5	1	1.125	...	Do.
Do.....	At recoil roller axes.....	.....do.....	18	1	1.125	...	Do.
Do.....	At retracting-chain sheaves.....	.....do.....	2	1	1.125	...	Do.
Do.....	At top of tripping levers and pawl shaft bearings.	.....do.....	4	1	1.125	...	Do.
Do.....	At gun levers, lower ends.....	.....do.....	2	1	1.125	...	Do.
Do.....	At elevating arms, four bearings.	.....do.....	4	1	1.125	...	Do.
Do.....	At traversing shafts, five bearings.	.....do.....	5	1	1.125	...	Do.
Do.....	At drum-shaft bearings, and idler gears.	.....do.....	5	1	1.125	...	Do.
Do.....	At pinion shaft bearing, retracting gear.	.....do.....	2	1	1.125	...	Do.
Pawls.....	Tripping gear.....	Forged steel, No. 3.	2	4	14.75	...	
Pawl pins.....	.....do.....	.....do.....	2	2.25	21.25	...	With 0.625 by 7-inch driven pins.
Pawl buffer blocks.....	.....do.....	Bronze.....	2	4	2.82	...	
Pawl lever cranks.....	.....do.....	Forged steel.....	2	.....	12	...	
Pawl levers.....	.....do.....	.....do.....	2	.....	70.25	...	
Pawl pin.....	At pawl, outside left chassis.	.....do.....	1	.....	6.625	...	With 0.875 split pin.
Pawl safety latch.....	Tripping gear.....	.....do.....	2	1	19.5	...	
Pawl shaft.....	.....do.....	.....do.....	1	2.125	108	...	
Pawl wheel.....	On retracting crank shaft	.....do.....	1	8	.....	...
Pins, dowel.....	Azimuth and elevation pointers.	Bronze.....	4	.875	1.5	...	
Do.....	In bushings, upper ends gun levers.	.....do.....	10	.75	2	...	
Do.....	In bushings, axle bed.....	.....do.....	24	.75	2	...	
Do.....	Elevating rack buffer nuts.	Steel.....	2	.375	3.25	...	
Do.....	Bushings in worm-wheel case.	Bronze.....	16	.5	1.25	...	
Do.....	Traversing rack to base ring.	Steel.....	39	.75	3	...	
Do.....	Pinning chassis and racer	.....do.....	4	1.5	10	...	
Pipe, plugs.....	Worm-wheel case.....	Bronze.....	3	.75	.....	...
Do.....	At filling and vent holes in top carriage.	.....do.....	6	.75	.....	...
Pipe, equalizing.....	Between recoil cylinders	Copper.....	1	1.125	.....	...	In two parts.
Pipe straps.....	Equalizing pipe to top carriage.	Wrought iron.....	2	2.5	.....	...
Piston and rod.....	In recoil cylinders.....	Forged steel, No. 3.	2	.....	220	4	4 nuts 4.25" thick; 4.2" thick.
Platform, inside working.	At base of chassis outside to racer.	Steel.....	2	.....	.....	...	1 right hand; 1 left hand.
Platform, outside working.	At rear upper outer edge of racer.	.....do.....	2	.....	.....	...	Do.
Platform, sighting.	On rear of right chassis.	.....do.....	1	.....	.....	...
Platform, top carriage.	On post on top carriage.	.....do.....	1	.....	.....	...
Post.....	To top carriage platform.	Cast steel.....	1	.....	33	...	
Post, base.....	On top carriage.....	.....do.....	1	.....	.....	...
Racer.....	On traversing rollers.....	Cast steel, No. 1.	1	213	.....	...	In halves.
Recoil rollers.....	In top of chassis.....	Forged steel, No. 3.	18	12	8	...	
Recoil roller axes.....	.....do.....	.....do.....	18	.....	.....	...
Retracting chains.....	From gun levers to drums.	.....do.....	2	.....	30.75	...	Three-fourths inch crane chain.
Retracting drums.....	On drum shaft.....	Cast iron, No. 2.	2	12.7	16	...	90 teeth.
Retracting gear wheel.	On second pinion.....	.....do.....	1	36.8	.....	...
Do.....	On drum shaft.....	Bronze, No. 3.....	1	37.6	.....	...	46 teeth.
Do.....	On third pinion.....	.....do.....	1	36.2	.....	...	64 teeth.

a Feet.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter or width.	Length.	Nuts.	Remarks.
Retracting gear, first pinion.	On crank shaft	Bronze, No. 3 ..	1	Ins. 9.6	Ins.		22 teeth.
Retracting gear, second pinion.	On drum shaft	Forged steel...	1	11.73			20 teeth.
Retracting gear, third pinion.	On crank shaft .....	....do.....	1	10.4			11 teeth.
Retracting cranks.	At ends of retracting shaft.	....do.....	2		44		With brass sleeves.
Retracting crank shaft.	Through chassis, below drum shaft.	Forged steel, No. 2.	1	5.125	138		
Retracting hand-wheels.	At ends of retracting shaft.	Bronze	2	13.25			With handles.
Roller bushings.	In retracting chain sheaves.	26 rollers, steel; 2 cages, bronze.	2	8.5	4.75		
Do	At intermediate shaft, traversing gear.	....do.....	2	8.5	4.75		
Do	At elevating pinion shaft.	32 rollers, steel; 2 cages, bronze.		4.25	9		
Do	At elevating wheel shaft.	22 rollers, steel; 2 cages, bronze.		3	7		
Do	At traversing shaft	22 rollers, steel; 2 cages, bronze.	2	8	7		
Do	At traversing bracket ..	40 rollers, steel; 2 cages, bronze.	2	8.875	6.25		
Do	At drum-shaft bearings..	44 rollers, steel; 2 cages, bronze.	2	5.5	9		
Do	At second pinion, retracting gear.	36 rollers, steel; 1 cage, bronze.	1	7.625	8.5		
Do	At third pinion, retracting gear.	56 rollers, steel; 2 cages, bronze.	2	5.75	4.5		
Do	At retracting crank shaft.	30 rollers, steel; 2 cages, bronze.		4	8.125		
Rollers, crank-pin.	Tripping gear	Steel	2	2	2.25		
Separator	At distance rings	Cast iron, No. 2	22		14.75		
Sleeve nut	Worm-wheel case	Bronze	1		6.5		
Steps	At rear of working platform.	Steel	2	15			1 right hand; 1 left hand.
Do	At sides of racer .....	....do.....	2	15			
Safety-latch cam.	At tripping gear	Forged steel ..	2	1.25	7		
Screws, button-head.	Name plates to top carriage.	Bronze	2	.25	.5		
Screws, flathead ..	Azimuth circle to base ..	....do.....	60	.5	1.125		
Do	Azimuth pointer cover ..	....do.....	5	.5	1.125		
Do	In piston liners .....	....do.....	16	.5	1.125		
Do	In direction plates .....	....do.....	20	.25	.5		
Screws, roundhead ..	Liners in top carriage ..	....do.....	28	.625	2.75	0	
Do .....	....do.....	....do.....	56	.625	2.25	0	
Screws, washer-head.	Azimuth pointer on racer.	Wrought iron ..	2	.75	1.875		
Do	Elevation pointer to chassis.	....do.....	2	.75	1.875		
Screws, special set.	Elevating band	Steel	2	2.5	11.25		
Do	Set screws at sight bar ..	Wrought iron ..	2	.75			Bent binding screws.
Screws, set	Cheek nut at friction disks.	....do.....	1	.875	1.625		
Do	In collars, on retracting and drum shafts.	....do.....	2	.875	1.75		
Split pins	In axles of retracting chain sheaves.	Steel	4	.5	4		
Do	At tripping-gear shaft ..	....do.....	2	.375	3		
Do	At ends of elevating shaft.	....do.....	2	.375	3		
Do	Cranks to traversing shaft.	....do.....	2	.375	3		
Staples	In counterweights .....	....do.....	38				
Sight standard	In piston-rod bracket ..	Cast steel	1		91.5		Right side.
Sight-standard cap.	On sight standard .....	....do.....	2	3	6.5		
Springs, pawl	At tripping gear	Steel	2	2			
Springs, pawl-buffer.	....do.....	....do.....	12	4	2.5		
Stop bolts	In chassis at elevating racks.	Wrought iron ..	2	2	4.25	2	
Stops, tripping lever.	On inside platform	Steel	2				5.75 inches high.
Studs	At top carriage caps	Wrought iron ..	4	3	14.5	8	4 nuts 3" thick; 4 1.375" thick.
Do	At cylinder heads, top carriage.	....do.....	32	1.25	5.5	32	

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter or width.	Length.	Nuts.	Remarks.
Studs.....	At gun-levers cap-square	Wrought iron...	4	<i>In.</i> 2.5	<i>In.</i> 15	8	4 nuts 2.5" thick; 4 1.125" thick.
Do.....	Yoke to gun levers.....	do.....	8	2.5	10.25	8	
Do.....	Cap to elevating arms.....	do.....	4	1.5	8	8	
Do.....	Worm-wheel case to racer.	do.....	6	1.5	5	6	
Do.....	At sighting platform.....	do.....	3	1	3.125	1	
Studs, special.....	Stop pins at pawl safety latch.	do.....	2		7		
Stuffing boxes.....	Recoil cylinders, front end.	Bronze.....	2	10.5	10		
Stuffing-box heads.	Top carriage, recoil cylinder head.	Cast steel, No. 2	2	10	10		
Throttling bars....	In top carriage cylinders.	Forged steel...	4	1.79	76.5		
Thrust bearing.....	At elevating worm.....	do.....	1	4.5			Contains 20 0.5-inch steel balls.
Top carriage.....	On recoil rollers, on chassis.	Cast steel, No. 2	1		91		
Tool hooks.....	At sides of chassis.....	Wrought iron...	8		4.25		0.875" thread.
Traversing bracket.	On chassis at traversing pinion.	Cast steel.....	1		48.25		
Traversing intermediate shaft.	At traversing intermediate shaft.	Cast iron.....	1		38.36		
Traversing pinion.	Traversing bevel gears to traversing pinion.	Forged steel, No. 2.	1	3.125	56.75		
Traversing pinion.	Traversing shaft to traversing rack.	do.....	1	10.667			14 teeth.
Traversing shaft..	Across middle of chassis.	Forged steel...	1	2.125	126.5		
Traversing cranks.	On traversing shaft.....	do.....	2		24.5		With brass sleeves.
Traversing intermediate bracket.	Inside right chassis.....	Forged steel, No. 2.	1	2.5	45.125		
Traversing bevel gear.	On intermediate shaft...	Cast iron.....	1	18.253			45 teeth.
Traversing bevel pinion.	On traversing shaft.....	Bronze.....	1	6.750			15 teeth.
Traversing intermediate bevel gear.	Traversing shaft to intermediate shaft.	Cast iron.....	1	28.29			46 teeth.
Traversing intermediate bevel pinion.	On traversing intermediate shaft.	Bronze.....	1	7.96			14 teeth.
Traversing rack....	Around base, inside.....	Forged steel...	1	160.5			In pieces.
Traversing rollers.	Between base and racer.	Forged steel, No. 3.	24	9	18		Conical.
Traversing stops...	Inside base.....	Wrought iron...	2	4	15		
Transom, front....	Between chassis.....	Cast steel, No. 1.	1	68			
Transom, rear....	do.....	do.....	1	68			
Tripping levers....	On tripping shaft.....	Forged steel...	2		60		
Wedges, leveling..	Under base.....	Shoe, cast iron; cover, sheet iron; wedges, forged steel.	24	9	16		Two under joints with safety pin.

AMMUNITION TRUCK.

(Price of ammunition truck separately, each \$875.)

[Three trucks for each carriage.]

Adjusting screw...	Under shot tray.....	Forged steel...	1	1.5	6.5		
Axis.....	Front end of truck.....	Forged steel, No. 2.	1	2.625	40		
Bearing.....	Carrying caster (fork)...	Bronze.....	1		4.375		
Do.....	Supporting plunger.....	do.....	2		6		
Bevel gear.....	On elevating screw.....	Cast iron, No. 2.	1	6.22			20 teeth.
Do.....	On crank shaft.....	do.....	1	3.412			10 teeth.
Bolts, through.....	Securing plunger stop.	Wrought iron...	2	.75	2.625	2	
Bracket.....	Crank shaft, upper end..	Bronze.....	1	6			Two bearings.
Caster (fork).....	At trail wheel.....	Cast steel.....	1		24.5		
Collar.....	At shoulders of axle bearings.	Forged steel...	2	3.75			With felt washer.
Do.....	At ends of axle.....	do.....	2	.75			With felt washer and taper pins.
Do.....	On crank shaft.....	do.....	1	2.25	.75		With taper pin.

List of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

AMMUNITION TRUCK—Continued.

Name of part.	Location.	Material.	Number.	Diameter or width.	Length.	Nuts.	Remarks.
Collar	On caster (fork) shank..	Forged steel..	1	Ins.	Ins.	...	Do.
Crank and shaft..	Elevating gear	do	1	1.125	56.75	...	With key.
Elevating head..	Supporting shot tray	Cast steel..	1	...	25	...	...
Elevating nut	In plunger	Bronze	1	5.875	...	...	Do.
Elevating screw..	In elevating nut	Forged steel..	1	1.5	18.5	...	1 long; 1 short.
Filler pieces	At rear end of shot tray ..	Wrought iron..	2	1.5	...	...	Sides, channels,
Frame and cartridge pans.	Body of truck	Steel	1	36	68.5	...	pan, and braces.
Handle	At rear, for pushing truck.	Wood (ash)...	1	2.5	40	...	...
Handle arms	Carrying pushing handle	Wrought iron..	2	2	...	...	...
Handwheel	On adjusting screw	Cast steel..	1	9.75	...	...	With taper pin.
Hinge pin	Under shot tray	Steel	1	1.5	12.5	...	With split pin and key.
Nuts	Binding front axle in body of truck.	do	2	2.625	1.75	2	...
Oil plug	At front-wheel hub	Bronze	2	1	1.125	...	0.5-inch thread.
Do	At caster-wheel hub	do	1	1	1.125	...	Do.
Plunger	Supporting elevating head.	Wrought iron..	1	6.5	34.625	...	...
Pin, caster-wheel..	In trail wheel	Steel	1	1	8.5	...	With 4-inch split pin at each end and key.
Pin	Holding filler pieces	do	1	.75	9.75	...	2 split pins.
Roller bushing	In caster-wheel hub	Rollers, steel; 1 cage, bronze.	1	1.75	5	...	...
Do	In truck wheels	22 rollers, steel; 2 cages bronze.	2	2.25	6	...	...
Separator, axle	Between side plates	W. I. pipe	1	3.5	9	...	...
Shot tray	Supported on elevating head.	Wrought iron..	1	...	51.5	...	With side pieces and stop hook.
Step	At foot of elevating screw and crank shaft.	Bronze	1	7.5	...	...	...
Step washer	In step at base of elevating screw.	Forged steel, hardened.	1	1.875	.25	...	...
Stop	Limiting rise and fall of plunger.	Wrought iron..	1	4.5	...	...	...
Wheel, caster	On front axle	Cast steel..	1	17	...	...	4 inches wide.
Wheels, truck	On front axle	do	2	25	...	...	Do.

SHOT TONGS.

(Seven pairs issued for each carriage.)

(Price each, \$12.89.)

12-INCH DISAPPEARING CARRIAGE, L. F., MODEL 1897.

(Price of carriage, \$39,500.)

Weights of principal parts.

Name of part.	No. of pieces.	Weight.
Leveling wedges (complete)	24 sets.	Pounds. 2,525
Base ring, including rack, azimuth circle, and stops	In halves.	86,371
Traversing rollers, bushed, axles, and keys	24 sets.	7,345
Distance rings, with fish plates, bolts, and separators	In halves.	2,994
Bacer, with azimuth cover and pointer and observation-hole covers	In halves.	30,505
Dust guard and screws	4 sections.	581
Chassis	2	33,221
Front transom	1	4,082
Rear transom, with elevating slide, screw, nut, ratchet friction wheel, pinion, and cover (complete)	1	10,254
Cages, recoil rollers, with bushings and axles	2 sets.	3,430
Top carriage, with piston rods, stuffing boxes, throttling bars, bolts, and oil	1	25,500
Gun lever arms, with axle, yoke, cap squares, and bushings	2	24,985
Elevating arm and pin	1	2,380
Elevating band (complete)	1	1,490

Weights of principal parts—Continued.

Name of part.	No. of pieces.	Weight.
		<i>Pounds.</i>
Buffer brackets, with caps, filers, and bolts.....	2	2,658
Piston-rod brackets, with bolts.....	2	1,129
Ladder and sight standards, with sighting platform (complete).....	3	969
Outside and inside platforms, plates, and angles.....		5,092
Brackets and brace for outside platform.....	18	1,654
Top-carriage platform (complete).....	3	156
Retracting chains.....	2	370
Retracting-chain drums and drum gear.....	3	990
Retracting crank shaft, cranks, collar, wheel, speed cranks, and roller bearings.....	12	706
Retracting drum shaft, collars, and roller bearings.....	7	545
Retracting gear wheel and second pinion and gear wheel and third pinion.....	2	850
Chain troughs and brackets (complete).....	2	222
Front, rear, and pit ladders.....	6	702
Traversing shaft, cranks, three collars, bevel pinion, and two roller bearings.....	9	204
Traversing pinion shaft, bearing, bracket, pinion, bevel gear, collars, and two roller bearings.....	9	591
Traversing intermediate shaft, brackets, bevel gear and pinion, collars, and two roller bearings.....	9	471
Pawl levers, with pawls, springs, and bolts.....	2 sets.	690
Tripping shaft, cranks, and levers.....	5	353
Elevating shaft, collars, handwheels, and roller bearings.....	11	372
Elevation scale and pointer.....	2	66
Chassis to racer and transoms, 66 bolts, 4 dowels, and 4 keys.....	74	867
Transoms to racer and buffer brackets to chassis, bolts.....	22	179
Racer halves together, 8 bolts and two keys.....	10	196
Base ring halves together, bolts.....	12	238
Miscellaneous bolts, keys, and small parts.....		240
Carriage.....		206,370
Counterweight bottom and 4 rods (complete).....	1	7,224
Crosshead, with pins, etc. (complete).....	1	8,962
Bottom weights, first layer, lead (computed).....	9	43,008
Weights, second to ninth layers, inclusive, lead (computed).....	17	89,688
Weights, detachable, lead (computed).....	72	6,939
		154,821
Ammunition trucks, 615 pounds each.....	3	1,845
Shot tongs, 43 pounds each.....	7	301
Implements.....		622
		2,768
Total weight of carriage.....		362,959

NOTE.—Carriages Nos. 1 to 12, inclusive, have special form of counterweight 3.5 inches shallower than the regular model. Layers 2 to 8, inclusive, weigh 70,310 pounds, and two special weights form the tenth layer. These weigh 7,657 pounds. There are but 60 detachable lead weights, 4,979 pounds, forming an eleventh layer. The 12 carriages of special design have a counterweight therefore weighing (lead) 139,444 pounds; total, 155,690 pounds. Nos. 1 to 5, inclusive, have a special form of key for connecting the suspension rods to the counterweight bottoms, and also to the crosshead.

12-INCH DISAPPEARING CARRIAGE, L. F., MODEL 1897.

Names of the parts, with their location and the material of which they are made.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Azimuth circle....	On base ring.....	Brass.....	1	<i>Ins.</i>	<i>Ins.</i>		In pieces as convenient.
Azimuth pointer..	Bolted to racer.....	Bronze.....	1				
Azimuth - pointer body.	.....do.....	.....do.....	1				2 screws and 2 dowels.
Azimuth - pointer collar.	Azimuth-pointer screw.....	.....do.....	1				One 1" pin.
Azimuth - pointer index.	Azimuth-pointer slide.....	.....do.....	1				1 screw.
Azimuth - pointer lid with hinge.	Bolted to racer.....	.....do.....	1				

Names of the parts, with their location and the material of which they are made—Cont'd.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Asimuth - pointer nut.	Asimuth-pointer screw.	Bronze.....	1	Inch.	Inch.		
Asimuth - pointer screw.	Through asimuth-pointer body and slide.	do.	1				
Asimuth - pointer slide.	On asimuth-pointer body.	do.	1				
Ball-bearing balls.	Between washers.....	Steel, hardened.	50	.5			
Ball-bearing washer.	Elevating screw.....	do.	2				Top and bottom parts.
Base ring.....	On platform.....	Cast iron, No. 2	1				In two parts, front and rear.
Base-ring slide.	Base ring.....	do.	1				On some carriages.
Base-ring slide screw.	Base-ring slide.....	Bronze, No. 8.	1				
Bolts (cheese head).	Front transom to chassis.	Wrought iron.	2	2.5	20	2	
Do.	do.	do.	12	2	18.5	12	
Do.	Pawl fulcrum.....	Forged steel, No. 8.	2	2.25	22.25	2	
Do.	Sight standard.....	Wrought iron.	2	2	8.625	2	
Do.	Traversing rack.....	do.	39	.875	2		Tap.
Bolts (counter-sunk).	Distance-ring joints (fish plates).	do.	24	1	4.25	24	With verona washers.
Do.	Distance-ring separators.	do.	66	1	5.25	66	Do.
Do.	do. joints, outside platform.	do.	24	.75	1.875	24	
Do.	Rope trough to supports.	do.	14	.625	1.5	14	
Do.	do. to end of brackets.	do.	18	1	.8	18	
Bolts (headless).	Racer joints.....	do.	2	2.5	11.5	4	
Bolts (hexagonal head).	Ammunition-truck step bracket to frame.	do.	4	.625	2	4	
Do.	Band set screw.....	Steel, No. 8.	2	2.5			Tap.
Do.	Band-trunnion set screw.	do.	2	1.125	5.5		
Do.	Base-ring joints.....	Wrought iron.	6	2	9.5	6	
Do.	do.	do.	6	2.5	10	6	
Do.	Brackets to racer.	do.	55	1.25	2.25		Do.
Do.	Brake-shaft bracket.	do.	4	.5	1.15	4	
Do.	Chassis to racer.	do.	26	2	.5		Do.
Do.	Crosshead gibs.	do.	8	.75	1.75		Do.
Do.	Dust guard to base ring.	do.	54	.825	1		Do.
Do.	Dust-guard joints.	do.	24	.625	.75		Do.
Do.	Elevating bands.	do.	2	3.5	28	2	
Do.	Elevating-gear cover.	do.	6	1	2		Do.
Do.	Elevating gibs to rear transom.	do.	24	1.75	5		Do.
Do.	Elevating scale to slide.	do.	4	1	3		Do.
Do.	Elevating-shaft bushing.	do.	6	1	1.75		Do.
Do.	Emptying coupling to top carriage.	do.	2	1	1.875		Do.
Do.	Front and rear ladders to chassis.	do.	16	1	1.75		Do.
Do.	Key in crosshead pin.	do.	4	1.5	2.5		Do.
Do.	Ladder steps to gun lever.	do.	24	1	1.75		Do.
Do.	Piston-rod bracket to chassis.	do.	4	1.75	3.75		Do.
Do.	do.	do.	4	1.75	5.25		Do.
Do.	Pit ladder.	do.	4	1	1.75		Do.
Do.	Platform plate to chassis.	do.	16	.75	1.25		Do.
Do.	Platform to standard.	do.	2	1	2		Do.
Do.	Racer joints.	do.	4	2.5	9	4	
Do.	Rear transom to chassis.	do.	4	2	10.5		Do.
Do.	do.	do.	10	2	13	10	
Do.	do.	do.	2	2	7.25	2	
Do.	Recoil-buffer brackets.	do.	8	1.75	3.75		Do.
Do.	do.	do.	4	2	15.5		Do.
Do.	Recoil-buffer brackets to piston-rod brackets.	do.	4	2	14.5		Do.
Do.	Recoil-buffer caps.	do.	4	2	14.5	4	
Do.	Retracting and drum-shaft bushings.	do.	8	1	1.75		Do.
Do.	Rope clamp to drums.	do.	8	1	3.25		Do.
Do.	Rope-sheave pins.	do.	2	.75	1.5		Do.
Do.	Rope stops to drum.	do.	2	.625	1.5		Do.
Do.	do.	do.	2	.9	1.125		Do.
Do.	Safety-latch fulcrum.	Steel.	2	1.5	7.5		Do.
Do.	Sight-standard caps.	Wrought iron.	4	.75	1.5		Do.
Do.	Straps to top carriage.	do.	8	.5	1		Do.

Names of the parts, with their location and the material of which they are made—Cont'd.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Bolts (hexagonal head).	Top plugs to filling and vent tubes.	Bronze	12	<i>In.</i>	<i>In.</i>		Fiber gasket.
Do	Throttling valve to top carriage.	Wrought iron.	2	1	1.875		Tap.
Do	Transoms to racer and chassis.	.....do.....	20	2	6		
Do	Traversing brackets.	.....do.....	3	1.6	7.25	3	
Do	Traversing intermediate brackets.	.....do.....	3	1.6	7	3	
Do	Traversing pinion bearing.	.....do.....	3	1.6	8.5		Do.
Do	Traversing stops on base ring.	.....do.....	4	1.75	4.875		Do.
Do	Yoke to gun levers.	.....do.....	2	3	6		Do.
Bolts (key in head).	Racer joints.	.....do.....	2	2.5	17.5		
Bolts (stud).	Cap to rear transom.	.....do.....	2	1.75	10.125	4	
Do	Gun-lever axle caps.	.....do.....	4	3	14.25	8	
Do	Gun-lever cap squares.	.....do.....	4	2.5	14.5	8	
Do	Platform to standard.	.....do.....	1	1	8.125	1	
Do	Stuffing-box heads.	.....do.....	82	1.25	8.5	32	
Do	Yoke to gun levers.	.....do.....	8	2.5	10.25	8	
Bolts (washer head).	Elevating-slide buffer bolts.	.....do.....	2	2	17.875		
Do	Elevation pointer to rear transom.	.....do.....	2	.75	1.875		
Do	Throttling bars.	.....do.....	28	1.125	4		Copper gaskets.
Do .....	.....do.....	.....do.....	16	1.125	4.25		Do.
Braces.	Outside platform.	.....do.....	1				
Brackets.	For outside platform.	Cast steel, No. 1	17				
Do	For piston rod (left).	Cast steel.	1				
Do	For piston rod (right).	.....do.....	1				
Buffer brackets.	Bolted to chassis.	Cast steel, No. 1	2				
Buffer cap.	Bolted to buffer bracket.	.....do.....	2				
Buffer, counter recoil (male).	Piston.	Forged steel, No. 3.	2				A part of piston and rod.
Do	Riveted to piston.	.....do.....	2				Secured by alteration of original form.
Do	Rear cylinder head.	Bronze	2				Original form.
Buffer, counter recoil (female).	.....do.....	.....do.....	2				Latest design, bushing in rear cylinder head.
Do	Piston.	Forged steel, No. 3.	2				In piston head, original form.
Do	Rear cylinder head.	Bronze	2				Secured by alteration of original form. Secured to rear cylinder head.
Buffer filler.	Between buffer plates.	Balsa.	20				
Buffer plates.	Between buffer filler.	Wrought iron.	18				
Bushing.	Base-ring slide.	Bronze	1				Brass screw.
Do	Chassis.	.....do.....	2				
Do .....	.....do.....	Steel.	6				
Do	Elevating arms.	Bronze	2				
Do	Gun-lever axle bed, top carriage.	.....do.....	2				
Do	Gear wheel on 3d pinion (retraction).	Forged steel.	1				
Do	Lower end of gun levers.	Bronze	2				
Do	2d pinion (retraction).	Forged steel.	1				
Do	3d pinion (retraction).	.....do.....	1				
Do	Recoil rollers.	Bronze	52				4 large and 48 small.
Do	Trunnion bed.	.....do.....	2				
Do	Traversing rollers.	.....do.....	48				
Cap.	Gun-lever axle, top carriage.	Cast steel, No. 2	2				
Cap-squares.	Gun lever.	.....do.....	2				
Chassis.	Bolted to racer.	Cast iron, No. 2.	2				Right and left.
Collar.	Azimuth pointer screws.	Bronze	1				With pin.
Do	Elevating shaft.	.....do.....	5				With felt washers and taper pins.
Do	Retraction drum shaft.	.....do.....	2				Do.
Do .....	.....do.....	Steel.	1				With set screw.
Do	Retraction crank shaft.	Bronze	1				With felt washers and taper pins.
Do .....	.....do.....	Steel.	1				With set screw.
Do	Suspension rod.	Forged steel, No. 3.	4				In halves.

Names of the parts, with their location and the material of which they are made—Cont'd.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Collar	Traversing shaft	Bronze	3	Inch.	Inch.		With felt washers and taper pins.
Do	Traversing intermediate shaft	do	2				Do.
Do	Traversing pinion shaft	do	2				Do.
Counterweight 1st layer.	Suspended from cross-head.	Lead	9				In 9 pieces.
Counterweight, 2d to 8th layers, inclusive.	do	do	14				2 pieces in each layer.
Counterweight, 9th layer.	do	do	3				In 3 pieces.
Counterweight, 10th layer.	do	do	72				Hand weights, carriages after No. 12.
Do	do	do	62				60 small pieces with 2 larger ones underneath.
Counterweight, bottom plate.	do	Cast steel, No. 1.	1				
Crosshead	On crosshead guides (chassis).	do	1				
Crosshead gibs	Riveted to crosshead	Tobin bronze	4				8 tap bolts and 32 brass rivets.
Crosshead liners	do	do	6				2 wide, 4 narrow, 48 brass rivets.
Crosshead pins	Secures gun lever to crosshead.	Forged steel, No. 2.	2				2 keys and 4 tap bolts.
Direction plates	On chassis (elevate and depress).	Bronze	2				8 brass screws.
Do	On chassis (retraction).	do	2				4 brass screws.
Do	On chassis (traversing).	do	2				8 screws.
Distance ring (inner).	Traversing rollers	Wrought iron.	1				In halves.
Distance ring (outer).	do	do	1				Do.
Dowel pins	Through chassis	Forged steel ..	4				2 in each chassis.
Dust guards	Bolted to base ring	Wrought iron.	1				In 4 pieces.
Elevating arm	Connects gun with elevating apparatus.	Cast steel, No. 1.	1				Set screw.
Elevating band	On gun	do	1				
Elevating-band trunnion.	Elevating band	Forged steel ..	2				2 set screws.
Elevating-band bolts and nuts.	Through lug on elevating band.	Wrought iron.	2	3.5	28	2	
Elevating bevel gear.	Elevating shaft	Bronze, No. 3.	1				18 teeth, 1.257" pitch, felt washer.
Do	Elevating intermediate shaft.	Cast iron, No. 2.	1				22 teeth, 1.257" pitch.
Elevating buffer springs.	Elevating-alide nut	Steel	2				
Elevating gear cover.	Bolted to rear transom ..	Cast iron	1				
Elevating gibs	do	Cast steel, No. 1.	2				
Elevating hand-wheel.	Elevating shaft	Wrought iron.	2				Cast-iron hub.
Elevating intermediate shaft.	Through bearing on rear transom.	Steel	1				2 keys, taper pin and nut.
Elevating pin	Through bearing arm and slide.	Forged steel, No. 3.	1				
Elevating pointer.	Rear transom	Brass	1				2 dowels.
Elevating ratchet pawl.	Ratchet pawl fulcrum ..	Steel	2				
Elevating ratchet pawl fulcrum.	Studded to transom	do	2				
Elevating ratchet pawl spring.	Ratchet pawl	do	1				
Elevating ratchet wheel.	Ball-bearing washer	do	1				88 teeth, .5" pitch.
Elevating retaining washer.	Thrust bearing	Bronze	1				
Elevating scale	Bolted to slide	do	1				
Elevating screw	Through elevating-alide nut.	Steel, No. 3.	1	3.75	63.35		1" pitch, 3 1/2" lead L. H., 2 keys.
Elevating shaft	Through chassis	Steel	1				6 collars, 8 keys, and 2 split pins.

Names of the parts, with their location and the material of which they are made—Cont'd.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inch.	Inch.		
Elevating slide....	Between gibs (rear transom).	Cast steel, No. 1.	1				
Elevating-slide nut.	Elevating slide.....	Bronze, No. 3.	1				2 bolts, 2 pins, and 2 steel springs.
Elevating-slide stop.	Rear transom	Forged steel..	1				Nut and pin.
Elevating-slide spring.	Elevating-slide bolts	Steel.....	2				
Elevating-spur gear.	Elevating screw.....	Cast iron, No. 2.	1				88 teeth, 15.2" pitch diameter.
Elevating-spur pinion.	Elevating intermediate shaft.	Bronze, No. 1.	1				12 teeth, 4.8" pitch diameter.
Emptying coupling.	Top carriage	do	1				
Emptying-coupling plug.	Emptying coupling	do	1				
Extractor	For cylinder head.....	Steel.....	2				
Eye screw	Gun-lever and top-carriage caps.	Forged steel..	4				
Filling and vent tubes.	Cylinders, top carriage ..	Steel.....	4				Copper gasket.
Filling and vent plugs.	do	Bronze	6	1	1.25		
Fish plates	Distance rings.....	Wrought iron..	4				
do	Dust guard	do	4				
Graduation strips.	Crosshead	Brass	2				
Grease cups	Gun-lever axle and gun levers.	Bronze	6				
Grease-cup covers.	Grease cups	do	6				
Grease-cup pistons.	do	do	6				Nut and pin.
Grease-cup piston springs.	On piston.....	Steel.....	6				
Grease-cup piston washers.	Screwed to piston	Bronze	6				Leather washer and screw.
Gun lever	Carrying gun.....	Cast steel, No. 1	2				
Gun-lever axle	Gun lever	Forged steel, No. 3.	1				
Gun-lever yoke.....	do	Cast steel, No. 1	1				
Handles	do	Wrought iron..	2				
do	For counterweights	Forged steel..	72				Cast in tenth layer of weights.
Hooks (S)	For lifting counterweights.	do	3				
Index plate (aximuth pointer).	Bolted to racer	Bronze	1				2 dowels.
Keys	Racer joints.....	Steel.....	2				
do	Chassis to racer	do	4				
Ladder	Chassis (front)	Forged steel..	2				
do	Chassis (rear)	do	2				
do	For pit.....	do	1				On right slide.
Ladder standard.	Chassis (right)	Cast steel.....	1				Keyed to bracket.
Leveling wedges.	On platform under base ring.	Forged steel..	24				4 have pins.
Leveling wedges, shoe.	do	Cast iron, No. 2	24				
Leveling wedges, cover.	do	Sheet iron	24				
Liners	Base-ring slide	Bronze	6				25 brass rivets and 10 brass screws.
Lining.....	Top carriage cylinders ..	Cast iron, No. 1	2				
Manhole cover	On inside platform	Steel plate	1				
Manhole-cover handle.	Manhole cover	Forged steel..	1				
Name plate.....	Top carriage.....	Bronze	1				2 brass screws.
Observation hole covers.	Racer.....	Steel plate	2				
Oil can	With each carriage	Brass	2				Capacity, $\frac{1}{2}$ pint each.
Oil can, with valve.	do	do	1				Capacity, 1 quart.
Oil plugs	For all oil holes	Bronze	60	.5			19 extra supplied with each carriage.
Pawl	Pawl casing	Forged steel, No. 3.	2				
Pawl-buffer blocks.	Pawl journal	Bronze	2				
Pawl-buffer springs.	Pawl-buffer block	Steel.....	12				
Pawl lever	Front of carriage.....	Cast steel, No. 2	2				
Pawl springs	Pawl	Forged steel..	2				

Names of the parts, with their location and the material of which they are made—Cont'd.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				<i>Ins.</i>	<i>Ins.</i>		
Pins	Leveling wedges	Steel	4				
Pinch bars	Top carriage into battery	Forged steel ..	2				
Pipes, equalizing and throttling.	Top carriage	Copper	5				
Pipes, connection	do	Bronze	10				
Pipes, connection followers.	Connects pipe to top carriage.	do	10				
Pipes, connection ring.	On pipes	Steel	10				
Pipes, connection straps.	Top carriage	Wrought iron.	4				Two kinds.
Piston and rod	Top-carriage cylinders.	Forged steel, No. 3.	2				Male buffer, forged solid with rod. Latest design.
Do	do	do	2				Male buffer pinned to rod. Modification of original design.
Do	do	do	2				Female buffer. Original design.
Piston-head liners.	Piston head	Bronze	8				
Platform (inside).	Racer	Steel plate ..	2				
Platform (outside).	On brackets, bolted to racer.	do	1				In 9 sections.
Platform post	Top carriage	Cast steel	1				
Platform sighting.	Rear of left chassis	Forged steel ..	1				
Platform top carriage.	Platform post	do	1				
Racer	On traversing rollers	Cast steel	1				
Railing	Sighting platform	Wrought iron.	1				
Retraction crank ..	Retraction-crank shaft ..	Forged steel ..	2				With brass sleeve.
Retraction-crank shaft.	Through chassis	Forged steel, No. 2.	1				4 keys, 2 collars, 1 taper pin, and 1 set screw.
Retraction drum ..	Drum shaft	Cast iron, No. 2	2				4 rope clamps and 2 rope stops.
Retraction-drum gear.	do	do	1				
Retraction-drum shaft.	Through chassis	Forged steel, No. 2.	1				8 collars, 6 keys, 2 taper pins, and 1 set screw.
Retraction gear ...	On second pinion drum shaft.	Cast iron, No. 2	1				90 teeth, 1.257" pitch.
Do	On third pinion drum shaft.	do	1				64 teeth, 1.875" pitch.
Retraction first pinion.	Retraction-crank shaft ..	Bronze, No. 3.	1				22 teeth, 1.257" pitch.
Retraction second pinion.	Retraction-drum shaft ..	do	1				20 teeth, 1.676" pitch.
Retraction ratchet pawl.	Pawl-pin chassis	Forged steel ..	1				
Retraction ratchet-pawl pin.	Chassis (left)	Steel	1				Split pin.
Retraction ratchet-pawl wheel.	Retraction-crank shaft ..	Forged steel ..	1				
Retraction third pinion.	do	Bronze, No. 3.	1				11 teeth, 2.513" pitch.
Retraction rope ...	Clamped to retraction drums.	Steel	2	0.75			34 feet long.
Retraction-rope clamp.	Bolted to drum	Forged steel ..	4				8 bolts.
Retraction-rope loop.	Retraction rope	do	2				24 pins.
Retraction-rope sheave.	Buffer bracket	Cast iron, No. 2	2				
Retraction-rope stop.	Bolted to retraction drum	Cast steel	2				
Retraction-rope trough.	Bolted to carriage	Steel plate	2				
Retraction-speed crank.	Retraction-drum shaft ..	Forged steel ..	2				
Retraction-trough angle.	Buffer bracket	Wrought iron.	2				
Retraction-trough bracket.	Rear transom	Cast iron	2				
Retraction-trough support.	Chassis	do	2				

* Five pieces.

Names of the parts, with their location and the material of which they are made—Cont'd.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Roller bearing	Elevating shaft.....	Bronze and steel.	3	Inch.	Inch.		
Do	Retraction-crank shaft.....	do	4				
Do	Retraction-drum shaft.....	do	3				
Do	Retraction-sheave pins.....	do	2				
Do	Traversing-crank shaft.....	do	3				
Do	Traversing intermediate shaft.....	do	2				
Do	Traversing-pinion shaft.....	do	2				
Roller-bearing cages.	Recoil roller.....	Cast steel, No. 2	2				
Roller-bearing cages, slide frames.	do	do	4				
Rollers, recoil	On chassis.....	Forged steel, No. 3.	26				2 large holes.
Rollers, recoil, axles.	Through side frame and rollers.	do	26				2 large, 24 small, and 26 nuts.
Safety latch	On latch fulcrum.....	Forged steel	2				
Safety-latch dog.	Crosshead.....	do	2				
Safety-latch fulcrum.	Front transom.....	Steel	2				
Safety-latch stop.	Driven into chassis.....	do	2				
Screws (button head).	Name and direction plates.	Bronze	22	0.25	0.5		
Screws (cheese head).	Azimuth pointer (Index plate).	Wrought iron.	2	.75	1.3		
Screws (counter-sunk).	Azimuth circle and pointer cover.	Bronze	65	.5	1.125		
Do	Azimuth index to slide.	do	1	.25	.7		
Do	Liners base ring slide.	Brass	10	.875	.75		
Do	Observation cover.	Bronze	32	.75	1		
Do	Platform plate.	do	190	.75	1		
Do	Rope-trough carriage.	Wrought iron.	10	.625	1.50		
Screws (headless).	Stuffing box.....	Steel	6	.5	.75		
Screws (hexagonal).	Collars, retraction and drum shaft.	Wrought iron.	2	.875	2		Set screw.
Do	Elevating pin.....	do	1	2	4		Do.
Screw-driver	Traversing-rack bolts.....	Steel	1				
Screw-driver, cross handle.	For general use.....	Bronze	2				With 12 hardened blades.
Separators	For distance rings.....	Cast iron, No. 2	22				
Sheave pin	Through buffer bracket and sheave.	Forged steel, No. 2.	2				2 tap bolts.
Sight-holder shoe.	Sight standard.....	Forged steel	2				
Sight standard	Piston-rod bracket.....	Cast steel	1				
Sight-standard caps.	Sight standard.....	Forged steel	2				
Sight-standard hand screw.	do	do	2				
Staples	Counterweights.....	do	43				Cast in 1st to 9th layers of weights, inclusive.
Stay	Top carriage to platform.	do	1				Pin and split pin.
Stops	Gun lever.....	Wrought iron.	10				2 different shapes.
Stuffing-box, front.	Front end of top-carriage cylinder.	Bronze	2				Spline screws, 7 rings, 0.875" square, Garlock packing for each box.
Stuffing-box follower.	Front and rear stuffing boxes.	do	4				
Stuffing-box gland	do	Forged steel	4				Made in halves.
Stuffing-box, rear.	Rear end of top-carriage cylinder.	Bronze and steel.	2				Spline screws and dowels, 4 rings, 0.875" square, Garlock packing for each box.
Stuffing-box head.	Top-carriage cylinder	Cast steel, No. 2	2				Fiber gasket. Dowels and spline screws.
Stuffing-box bushing.	Cylinder head.....	Bronze	2				Spline screws.
Suspension rods	Suspended from cross-head.	Forged steel, No. 3.	4				With keys.
Throttling bar	Recoil cylinder, top carriage.	Forged steel	4				
Throttling valve	Throttling-valve stem	Steel	1				

Names of the parts, with their location and the material of which they are made—Cont'd.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Throttling-valve body.	Top carriage.....	Bronze	1	Ina.	Ina.	...	Graduated to indicate valve opening in decimal square inch.
Throttling-valve gland.	Body of valve	do	1	.....	.....	.....	Packing.
Throttling-valve latch.	do	do	1	.....	.....	.....
Throttling-valve padlock.	Yoke of valve	do	1	.....	.....	.....	Yale.
Throttling-valve seat.	Body of valve	Steel	1	.....	.....	.....
Throttling-valve stem.	Valve yoke	Bronze	1	.....	.....	.....
Throttling-valve yoke.	Body of valve	do	1	.....	.....	.....
Throttling-valve tubes.	Recoil cylinders, top carriage.	Steel	2	.....	.....	.....	Pinned to cylinders.
Top carriage	On recoil rollers.....	Cast steel, No. 2	1	.....	.....	.....
Tool hooks	Chassis	Wrought iron.	8	.....	.....	.....
Transom (front)...	Bolted to chassis	Cast steel, No. 1	1	.....	.....	.....
Transom (rear)...	do	do	1	.....	.....	.....
Transom cap	Rear transom	do	1	.....	.....	.....
Traversing bevel gear.	Traversing intermediate shaft.	Cast iron, No. 2	1	.....	.....	.....	46 teeth, 1.257" pitch.
Traversing bevel pinion.	Traversing shaft	Bronze	1	.....	.....	.....	15 teeth, 1.257" pitch.
Traversing bracket.	Bolted to chassis	Cast steel	1	.....	.....	.....
Traversing crank	Traversing shaft	Forged steel..	2	.....	.....	.....	With brass sleeve.
Traversing intermediate bevel gear.	Traversing pinion shaft.	Cast iron, No. 2	1	.....	.....	.....	46 teeth 1.571" pitch, taper pin.
Traversing intermediate bevel pinion.	Traversing intermediate shaft.	Bronze	1	.....	.....	.....	14 teeth 1.571" pitch.
Traversing intermediate bracket.	Bolted to chassis	Cast iron, No. 2	2	.....	.....	.....	Different shapes, 1 of each.
Traversing intermediate shaft.	Through traversing intermediate brackets.	Forged steel, No. 2.	1	.....	.....	.....	2 collars and 2 taper pins.
Traversing pinion.	Traversing pinion shaft.	Bronze, No. 3.	1	.....	.....	.....	14 teeth, 2.094" pitch.
Traversing-pinion bearing.	Racer	Cast steel, No. 1	1	.....	.....	.....
Traversing-pinion shaft.	Through traversing bracket and bearing.	Forged steel, No. 2.	1	.....	.....	.....	2 collars, 3 taper pins and key.
Traversing rack ...	Bolted to base ring	Forged steel..	1	.....	.....	.....	234 teeth, 2.094" pitch, made in pieces as convenient.
Traversing-rack screw.	Traversing rack to base ring.	Wrought iron.	39	.875	2.75	...	
Traversing roller ..	On base ring	Forged steel, No. 3.	24	.....	.....	.....
Traversing-roller axles.	Through distance ring and rollers.	Forged steel..	24	.....	.....	.....
Traversing-roller eye screw.	For traversing rollers.....	do	2	.....	.....	.....
Traversing shaft...	Through chassis.....	Steel	1	.....	.....	.....	3 collars, 3 taper pins, 3 keys, and 2 split pins.
Traversing stops...	Bolted to base ring	Wrought iron.	2	.....	.....	.....
Tripping crank	Tripping shaft	Forged steel..	2	.....	.....	.....
Tripping-crank pins.	Through crank and pawl levers.	Forged steel, No. 3.	2	.....	.....	.....	2 collars, 2 rollers, 2 pins, and 2 nuts.
Tripping lever	Tripping shaft	Forged steel..	2	.....	.....	.....
Tripping-lever buffer.	Bolted to racer	do	2	.....	.....	.....
Tripping-lever shaft.	Through chassis	do	1	.....	.....	.....	2 feathers and 2 keys.
Washer	Bushing retraction crank shaft.	Bronze	2	.....	.....	.....
Washer (retaining)	Thrust-bearing elevating gear.	do	1	.....	.....	.....
Wrenches (box)...	Buffers, cylinder-head...	Forged steel..	1	.....	.....	.....
Wrenches (double)	For 1" and 1.2" nuts	Steel	1	.....	.....	.....
Do	For 1.5" and 1.75" nuts	do	1	.....	.....	.....
Do	For 2" and 2.5" nuts	do	1	.....	.....	.....
Do	For 3" and 3.5" nuts	do	1	.....	.....	.....

Names of the parts, with their location and the material of which they are made.—Cont'd.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Wrenches(double)	Elevating-band trunnions.	Forged steel.	1	Inch.	Inch.		6.125" and 7.625".
Wrenches (single).	Piston-rod nuts.	do	1				6.125".
Wrenches	Filling, vent, and drain plugs.	do	1				1.25".
Wrenches (spanner).	For stuffing box	do	2				
Wrenches (monkey).	For general use.	Steel.	1				With wooden handle. Size, 12" wrench.

AMMUNITION TRUCK.

(Price of ammunition truck separately, each \$375.)

Arm	Riveted to frame	Steel	2				
Axle	For ammunition truck	Forged steel, No. 2.	1				2 washers, 2 nuts, 2 split pins, and 1 taper pin.
Bevel gear	Elevating screw	Cast iron, No. 2	1				20 teeth, 5.714" pitch diameter.
Bevel pinion	Elevating crank	Bronze	1				10 teeth, 2.857" pitch diameter.
Bracket	For shot tray	do	1				
Brake lever	Brake shaft	Steel	1				
Brake-leverspring.	Brake lever	do	1				
Brake shaft	Through brake-shaft bracket.	do	2				1 key, 2 taper pins.
Brake-shaft bracket.	Bolted to frame	do	2				4 bolts.
Bushings	For caster and truck wheels.	Bronze	3				
Brake shoe	Brake shaft	Cast iron	2				
Cartridge pan	On pan support (frame).	Steel	2				
Caster	Caster bracket	Cast steel	1				Collar and taper pin.
Caster bracket	Riveted to frame	Bronze	1				
Caster wheel	For ammunition truck (caster).	Cast steel	1				Rubbertire. Some trucks have bronze wheels.
Caster-wheel pin	Through caster and wheel.	Forged steel	1				Split pin.
Crank	For elevating the shot tray.	do	1				Collar, key, and taper pin.
Elevating screw	Inside of plunger	do	1				Threads, 3 per inch, left hand.
Frame	For ammunition truck	Steel	1				
Handle	Through arms	Ash	1				2 pins, riveted at both ends.
Nut	Riveted to plunger (inside).	Bronze	1				
Oil plugs	For all oil holes	do	1	.5			
Plunger	Inside of plunger sleeve.	Wrought-iron pipe.	1				
Plunger sleeve	Outside of plunger	Bronze	1				
Shot tray	Bracket for tray	Forged steel	1				
Step bracket	Bolted to sleeve	do	1				
Step washer	Step bracket	Forged steel, hardened.	1				
Stop	Shot tray	Wrought iron.	1				
Stop piece	Plunger sleeve	Steel	1				
Stop support	Shot tray	Wrought iron.	1				
Tripping arm	Riveted to plunger	Bronze	1				
Tripping bolt and nut.	Handwheel	Forged steel	1				Nut and split pin.
Tripping hand-wheel.	Tripping arm	Bronze	1				
Tripping nut	do	Steel	1				
Tripping-nut trunnions.	Tripping nut	do	2				2 taper pins.
Truck wheel	On axle	Cast steel	2				Rubbertires. Some trucks have bronze wheels.

12-INCH DISAPPEARING CARRIAGE, L. F. MODEL, 1901.

(Price of carriage, \$41,000.)

NAMES OF THE PARTS OF CARRIAGE WITH THEIR LOCATION, MATERIAL, CORRECT NOMENCLATURE, ETC.

Names of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inches.	In.		
Arm guard	On left chassis.....	Steel	1				In pieces as convenient.
Arrows	Riveted to pawllevers	Brass	2				
Asimuth circle	Base ring	do	2				
Asimuth pointer body.	Bolted to racer.....	Bronze	1				
Asimuth pointer collar.	Asimuth pointer screw	do	1				
Asimuth pointer index.	Asimuth pointer slide	do	1				
Asimuth pointer lid and hinge.	Bolted to racer.....	do	1				
Asimuth pointer nut.	Asimuth pointer screw	do	1				
Asimuth pointer slide.	Asimuth pointer body	do	1				
Asimuth pointer dowels.	do	do	2	0.375	0.75		
Axle bed bushings	Top carriage	do	4				In two parts. Top and bottom parts.
Base ring	On platform	Cast iron No. 2	2				
Ball thrust bearing disks.	Elevating screw	Forged steel..	2				
Ball thrust bearing balls.	Between disks.....	Steel	50	.5			
Bolts countersunk head.	Sight platform to brackets and standards.	do	16	.75	3	16	
Do.....	Corner braces and platform brackets.	do	10	.75	2.625	10	
Do.....	Railings to platform.	do	14	.75	2.125	14	
Do.....	Rope trough supports.	do	14	.625	1.5	14	
Do.....	to platform brackets.	do	18	1	3	18	
Do.....	to joints	do	24	.75	1.875	24	Free.
Bolts filler head.	Asimuth pointer body	do	2	.75	1.25		
Do.....	Spring collars	do	2	2.5	.5		
Do.....	Firing arm and lower trigger to shaft.	do	2	.44	1.04	2	
Do.....	Dog to top car	do	2	.75	1.5		
Do.....	Spring bracket	do	2	.5	.75		
Do.....	Lower trigger guard.	do	2	.5	1		
Do.....	Wire cord to trigger.	do	1	.375	1		
Do.....	Magneto box to chassis.	do	2	1	2		
Do.....	Trigger guards to controller extension bracket.	do	2	.5	2.06	2	
Do.....	Controller standard to platform.	do	5	.875	1.125		
Do.....	Traversing rack	do	54	.875	1.75		
Bolts hex. head.	Base ring joints	do	8	2.5	10	8	Drive fit.
Do.....	do	do	6	2	9.5	6	Key free fit.
Do.....	do	do	2	2.5	16.5		Free fit.
Do.....	Drain plugs to base ring.	Bronze	12	1.75	1.25		
Do.....	Distance ring joints ..	Steel	24	1.375	5	24	Drive fit.
Do.....	do	do	24	1.375	7	24	Do.
Do.....	Traversing roller bearings to distance ring.	do	96	.875	3		Sung fit.
Do.....	Dust guard to base ring	do	36	.75	1.875		Free.
Do.....	Bearing to cover	do	4	.75	2.625	4	Drive.
Do.....	Brackets to racer	do	55	1.25	2.75		Free.
Do.....	Pit ladder	do	4	1	1.75		Do.
Do.....	Brackets to chassis ..	do	18	1.25	2.375		Do.
Do.....	Front ladders to chassis.	do	2	1	3.75	2	Do.
Do.....	do	do	2	1	4.25	2	Do.
Do.....	Front ladders to brackets.	do	4	1	2.375		Do.
Do.....	Rear ladders to chassis	do	2	1	2		Do.
Do.....	do	do	2	1	1.5		Do.
Do.....	Rear ladder to	do	4	1	2.125	4	Do.
Do.....	Platform to sight standards.	do	1	.75	5.625	1	Do.

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Names of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Bolts, hex. head...	Controller extension bracket to standard.	Steel.....	2	Inches. 1	Inch. 1.75	...	Free.
Do.....	Cocking handle guide.	.....do.....	2	.75	1.25	...	Do.
Do.....	Elevating band.....	.....do.....	2	3.5	28	2	Do.
Do.....	Elevating slide buffer.	.....do.....	2	2	17½	...	Free washer head.
Do.....	Elevating scale to elevating slide.	.....do.....	4	1	8	...	Snug.
Do.....	Elevating pointer to rear transom.	.....do.....	2	.75	1.375	...	Free washer head.
Do.....	Brake bracket to racer.	.....do.....	2	1.5	5.75	...	Snug.
Do.....	Traversing pinion bearings.	.....do.....	8	1.5	8.5	...	Free.
Do.....	Traversing bracket...	.....do.....	8	1.5	7.25	8	Drive.
Do.....	Traversing intermediate bracket.	.....do.....	8	1.25	7	8	Do.
Do.....	Retracting and drum shaft bushings.	.....do.....	8	1	1.75	...	Free.
Do.....	Rope troughs to carriage.	.....do.....	10	.75	1.5	...	Do.
Do.....	Rope clamps to drums.	.....do.....	8	1	3.25	...	Do.
Do.....	Elevating and retracting motor bracket to chassis.	.....do.....	2	1	5.25	2	Do.
Do.....	.....do.....	.....do.....	2	1	5.625	2	Do.
Do.....	Traversing motor bracket to chassis.	.....do.....	4	1	4.625	4	Do.
Do.....	Motors to brackets.	.....do.....	8	.625	3.5	8	Drive.
Do.....	Standards to racer.	.....do.....	8	1.5	8	...	Free.
Do.....	.....do.....	.....do.....	4	1.5	4.5	...	Do.
Do.....	Parallel arm bracket to standard.	.....do.....	6	1	2.75	...	Do.
Do.....	Brackets to standards.	.....do.....	8	1.5	4.25	8	Drive.
Do.....	Brackets to chassis.	.....do.....	2	3	15.5	2	Do.
Do.....	.....do.....	.....do.....	2	2	8	2	Do.
Do.....	Binding right standard socket.	.....do.....	2	1.5	7.75	2	Free.
Do.....	Platform bracket to standard.	.....do.....	4	1.25	2.25	...	Do.
Do.....	.....do.....	.....do.....	1	1.25	3.5	...	Do.
Do.....	Rocker bracket to standard.	.....do.....	2	.75	1.5	...	Do.
Do.....	Cover to standard.	.....do.....	2	.75	2.5	...	Snug.
Do.....	.....do.....	.....do.....	6	.75	1.75	...	Free.
Do.....	Dust guard joints.	.....do.....	6	.75	1.875	6	Square under head.
Do.....	Racer joints.	.....do.....	6	2.5	9	6	Drive.
Do.....	.....do.....	.....do.....	6	2.5	10.5	6	Do.
Do.....	Chassis to racer.	.....do.....	26	2	5	...	Free.
Do.....	Circuit breaker box to chassis.	.....do.....	4	.625	1.25	...	Do.
Do.....	Transoms and clips to racer and chassis.	.....do.....	28	2	5	...	Do.
Do.....	Front transom to chassis.	.....do.....	2	2.5	20	2	Drive.
Do.....	.....do.....	.....do.....	12	2	13.5	12	Do.
Do.....	Rear transom to chassis.	.....do.....	4	2	10.5	...	Free.
Do.....	.....do.....	.....do.....	8	2	13	8	Do.
Do.....	.....do.....	.....do.....	2	2	7.25	2	Drive.
Do.....	Elevating gear cover.	.....do.....	6	1	2	...	Free.
Do.....	Elevating gibs to rear transom.	.....do.....	24	1.75	8.75	...	Do.
Do.....	Buffer brackets to chassis.	.....do.....	8	1.75	3.75	...	Do.
Do.....	.....do.....	.....do.....	4	2	15.5	...	Do.
Do.....	Buffer brackets to piston rod brackets.	.....do.....	4	2	14.5	...	Do.
Do.....	Buffer bracket cap.	.....do.....	4	2	14.5	4	Do.
Do.....	Rope sheave pins.	.....do.....	2	.75	1.5	...	Do.
Do.....	Throttling bars.	.....do.....	28	1.125	4	...	Snug, washer head.
Do.....	.....do.....	.....do.....	16	1.125	4.25	...	Do.
Do.....	Throttling valve and emptying coupling to top carriage.	.....do.....	4	1	1.875	...	Free.
Do.....	Straps to top carriage.	.....do.....	8	.5	1	...	Do.

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Names of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				<i>Inches.</i>	<i>Ins.</i>		
Bolts, hex. head...	Yoke to gun levers...	Steel.....	2	3	6		Free.
Do.....	Axles to gun levers...	do.....	12	3	11.75		Do.
Do.....	Cross head gibs...	do.....	12	.75	1.75		Do.
Do.....	Key in cross head pins...	do.....	4	1.5	2.5		Do.
Do.....	Pawl fulcrum...	Steel No. 3	2	2.25	22.125		Drive.
Do.....	Elevating shaft bearings...	Steel.....	6	1.	1.75		Free.
Do.....	Controllers to platform...	do.....	8	.625	.875		Do.
Do.....	Arm guard to standard and chassis...	do.....	4	.75	1.25		Do.
Do.....	Miter box cover...	do.....	6	.625	1.75	6	Do.
Do.....	Miter box to platform...	do.....	4	.75	1.5		
Do.....	Cross handle screw-driver...	do.....	2	.625	1.5		Washer head,
Do.....	Step bracket to frame...	do.....	4	.625	2		Free.
Do.....	Plunger stop...	do.....	1	.625	.75		Do.
Do.....	Brake shaft bracket...	do.....	4	.5	1.125	4	
Bolts, round head...	Wire to cocking arm and lower trigger...	do.....	3	.44	2	1	
Buffer caps...	On buffer brackets...	Cast steel No. 1	2				
Buffer brackets...	Bolted to chassis...	do.....	2				
Buffer fillers...	On buffer brackets...	Balata	20				
Buffer plates...	do.....	Wrought iron	18				
Buffer liner...	In counter recoil buffer...	Bronze No. 4	2				
Bushing...	Recoil rollers...	Bronze.....	48	1.5 x 2			
Do.....	do.....	do.....	4	2 x 2.5			
Do.....	Rear transom...	Bronze, No. 2	2	2 x 3.002			
Do.....	Rear cylinder heads...	Bronze, No. 4	2	4.75 x 6.88	4.75		
Do.....	Traversing pinion bearing...	Bronze, No. 2	1	3.875 x 4.	6.25		
Do.....	Second retracting pinion...	Steel.....	2	5.5 x 6....	4.5		
Do.....	Third retracting pinion...	do.....	2				
Do.....	Lower-end gun-lever arms...	Bronze, No. 4	2				Forced in 16-.75" x 2" pins.
Do.....	Trunnion bearing gun-lever arms...	do.....	2				Screwed to gun-lever arms.
Do.....	Tripping shaft bearings...	do.....	2	2.25 x 3.002	7		Forced in.
Do.....	Upper end elevating arms...	do.....	2	6.25 x 7.008	4.24		
Do.....	Traversing shaft bearings...	do.....	2	2 x 3.002..	7		8-.875" x 2" bronze pins.
Do.....	Rope sheaves...	Steel.....	2	3.5 x 4.25			
Do.....	Intermediate traversing brackets...	Bronze.....	2	2.5 x 3.502	5		8-.875" x 2" bronze pins.
Do.....	Traversing bracket...	do.....	1	3.125 x 3.875	4.875		4-.875" x 2" bronze pins.
Do.....	Elevating shaft bearings...	do.....	2	2 x 2.502..	7		8-.875" x 2" bronze pins.
Do.....	Elevating intermediate shaft...	do.....	1	1.75 x 2.25	2.5		
Do.....	Rocker brackets...	do.....	2	.627 x 1.27	1.625		
Do.....	Sight-elevating mechanism...	Bronze, No. 3	1	2 x 2.75..	5		
Cap square...	Top carriage...	Cast steel, No. 2	2				
Do.....	Gun-lever arms...	do.....	2				
Chassis...	Bolted to racer...	Cast iron, No. 2	2				Right and left.
Clips...	do.....	Cast steel, No. 1	3				2 front, 1 rear.
Collar...	Equalizing pipe...	Copper.....	8	1.45.....	.4		Brased to pipe.
Do.....	Suspension rods...	Steel, No. 3	4	3.5 x 5.44.	2.5		Cut in halves.
Do.....	Tripping crank pin...	Steel.....	2	1 x 2.....	1		
Do.....	Elevating shaft...	Bronze.....	4	2 x 4.45..	2		4-.3125" x 4.75" taper pins.
Do.....	Traversing shaft...	do.....	2	2 x 4.45..	2		2-.3125" x 4.75" taper pins.
Do.....	Traversing pinion shaft...	do.....	2	3.125 x 7.5			2-.31" x 7.5" taper pins.
Do.....	Retracting drum shaft...	do.....	2	2.5 x 4.96	2.5		2-.3125" x 5.25" taper pins.
Do.....	do.....	Steel.....	1	5.25 x 8.75	2.25		1-.875" x 2" set screw.
Do.....	Retracting crankshaft...	do.....	1	4.75 x 8.25	2.5		Do.
Do.....	Controller pinion...	Bronze.....	1	.5 x 2.....	.625		

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Names of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Collar	Intermediate traversing shaft.	Bronze	2	Inches. 2.5 x 4.96	Inch. 2	...	2.31" x 5.25" taper pins.
Counterweight	Suspended from crosshead.	Lead					Mod. 1900 rifle, 102 pieces, 156,660 pounds. Mod. 1896 rifle, 98 pieces, 137,810 pounds.
Counterweight bottom plate.	Under lead weights ..	Cast steel	1				
Counterweight handles.	Hand weights	Forged steel ..	72	.5			Cast in weights.
Counterweight staples.	Counterweights	do	51	1			Do.
Crosshead	On guides of chassis..	Cast steel, No. 1.	1				
Crosshead gibs....	Bolted to crosshead ..	Bronze, No. 4 ..	4				
Crosshead graduation strips.	Front of crosshead ...	Brass	2				
Crosshead pins	Gun-lever arms to crosshead.	Steel, No. 2....	2	14.5	22.75		
Crosshead pin keys	Bolted to crosshead ..	Steel	2				
Cylinder heads	Bolted to cylinders...	Cast steel, No. 2.	2				
Corner braces	Sighting platform	Steel	2				
Cylinder-head extractors.	Cylinder heads	do	2				Eyebolts.
Direction plates...	On elevating hand wheels.	Bronze	4				2 elevating and 2 depressing.
Do	On chassis	do	2				Traversing.
Do	do	do	2				Retraction.
Distance rings....	On traversing rollers.	Cast steel, No. 2	1				Made in 6 sections.
Dowel pins	Chassis	Steel	4				Taper .75" per foot.
Dust guard	Base ring	Steel	1				In 6 sections, 12 handles, felt top.
Dust-guard clamp.	Dust-guard joints	Steel	6				.875" x 2.5" x 4".
Elevating arms....	Breech of gun	Cast steel, No. 1					
Elevating band....	do	Cast steel					Model 1896 gun, 44.5". Model 1900 gun, 48.75".
Elevating band trunnion.	Elevating band	Forged steel, No. 2.	2	6.244	10.73		Screwed into band.
Elevating bevel gear.	Elevating shaft	Bronze, No. 3.	1				18 T 24 per inch.
Do	Elevating intermediate shaft.	Cast iron, No. 2	1				22 T 24 per inch.
Elevating buffer spring.	Slide nut	Steel	2	4	10.375		
Elevating gear cover.	Rear transom	Cast iron	1				
Elevating gibs....	do	Cast steel	2				
Elevating hand wheel.	Elevating shaft	Wrought and cast iron.	2				Wrought-iron spokes, cast-iron hubs.
Elevating intermediate shaft.	Rear transom	Forged steel ..	1	2	24.5		
Elevating pin	Lower end elevating arm.	Forged steel, No. 3.	1	5.625-.006	17.97		
Elevating pin bushing.	Elevating slide	Bronze, No. 2.	2	5.625 x 6.875			8-.375" x 1.25" bronze pins.
Elevating pointer.	Rear transom	Bronze	1				2-.375" x 1.5" dowels.
Elevating scale....	Elevating slide	do	1				
Elevating screw...	Rear transom	Forged steel, No. 3	1	3.75	54.25		1" pitch, 8 1/2" lead left hand.
Elevating shaft....	Through chassis	Forged steel ..	1				3 keys, 2 feathers, 2 split pins.
Elevating shaft bearings.	Bolted to chassis	Cast iron	2	4.5	10.25		
Elevating slide....	Rear transom	Cast steel	1				
Elevating slide nut	Elevating slide	Bronze, No. 3.	1				
Elevating spur gear	Elevating screw	Cast iron	1	16			33 teeth 2.5 per inch. 12 teeth 2.5 per inch.
Elevating spur pinion.	Elevating intermediate shaft.	Bronze, No. 3.	1	4.8			

Names of the parts of carriages, location, material, correct nomenclature, etc.—Continued.

Names of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Elevating ratchet.	Elevating screw	Steel	1	Inches.	In.		
Elevating ratchet pawls.	Elevating ratchet	do	2				
Elevating ratchet pawl fulcrum.	Rear transom	do	2				
Elevating ratchet pawl spring.	Elevating ratchet	do	1				.0025" x .9" flat spring 24.75" long.
Elevating stop	Rear transom	do	1				
Emptying coupling.	Bolted to top carriage.	Drop-forged steel.	1				
Emptying valve plug.	Emptying coupling ..	Bronze, No. 4.	2	1.875	1.75		6 threads per inch standard thread.
Equalising and throttling pipes.	Top carriage	Copper	4				1.125" outside diameter, in front 2 pieces .22" thick, 49" long, in rear 2 pieces 70" long.
Do	do	Steel					1.25" outside diameter, .134" thick, center connection 1 piece 29" long, figured long to allow for variation in carriages.
Eyebolts	Gun lever axle caps, trunnion bed caps.	do	4	1.	.875		
Filling plug in instruction plate.	Top carriage	Bronze	2				
Filling and vent tubes.	do	Steel	4	1.75	3.75		1.75" tap 10 threads per inch driven outward.
Filling and vent plugs.		Bronze	12	1.	1.		6 extra.
Follower	Stuffing boxes	Forged steel ..	4	6.25	1.5		Cut in halves.
Front brackets	Light platform	Cast steel, No. 1	2				Bolted to chassis.
Gaskets	Rear cylinder heads ..	Fiber	2	15 x 15.5			.06" thick.
Do	Throttling bar bolts ..	Copper	44	1.125 x 2.125			Do.
Do	Equalising pipes	Fiber	10	.09 x 1.48			Do.
Do	Filling and vent plugs	do	12	1.1 x 1.5			Do.
Do	Filling and vent tubes	Copper	4	1.75 x 2.25			Do.
Do	Stuffing boxes	Garlocks	28				7 rings Garlocks hydraulic packing for each stuffing box.
Glands	do	Bronze, No. 4.	4	6.25	4.75		10 threads per inch.
Graduated scales ..	Elevating scales	German silver	1				Elevation scales to be graduated in shop, range scales after carriage is in implement.
Grease cups	On large bearings	Bronze	8				
Grease-cup covers ..	Grease cups	do	8				
Grease-cup pistons ..	do	do	8				
Grease-cup piston springs.	do	Steel	8				Nut and pin.
Grease-cup washers.	Screwed to piston	Bronze	8				Leather washer and screw.
Gun-lever arm	Supporting gun	Cast steel	2				Right and left.
Gun-lever axle	Gun-lever arms	Forged steel, No. 3.	1				Forged into gun lever arms and bolted.
Gun-lever yoke	Bolted between gun lever.	Cast steel					
Hand rail	Sighting platforms and ladders.	Wrought-iron pipe.	2	1			
Hooks	Lifting traversing rollers.	Steel	1				

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Names of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				<i>Inches.</i>	<i>Ins.</i>		
Hooks	Lead weights	Steel	3				S-shaped.
Keys	Racer joints	Steel	2				
Do	Chassis to racer	do	4				
Do	Suspension rods to crosshead, No. 3	Forged steel	2				
Ladders	Sighting platform	Steel	4				
Do	In pit.	do	1				
Liners	Elevating slide	Bronze, No. 2	2				
Do	Crosshead	Bronze, No. 4	2				
Do	Racer	Bronze	1				.356"x8" wide riveted and screwed in. Shrunken in.
Lining	Topcarriage cylinders	Cast iron	2				
Manhole cover	On inside platform	Steel plate	1				
Manhole-cover handle.	Manhole cover	Forged steel	1				
Name plate	Top carriage	Bronze	1				2 brass screws.
Oil can	Oiling bearings	Brass	2				
Oil, locomotive	do	do	1				
Oil plugs	All oil holes	Bronze	90				Including 16 extra.
Oil tubes	Driven in racer	Steel	4				
Parallel arm	Right standard	Bronze	1				
Parallel arm bracket.	do	Cast steel	1				
Parallel arm fulcrum.	Parallel arm	Bronze	2				.375"x3" split pin.
Pawl	Tripping pawl casing, No. 3	Forged steel	2				
Pawl-buffer blocks.	Tripping pawl journal	Bronze	2				
Pawl-buffer springs	Tripping-pawl buffer blocks	Steel	12				
Pawl levers	Front of carriage	Cast steel, No. 2	2				
Pawl springs	On pawls	Forged steel	2				
Pinch bars	Top carriage into battery	Steel	2				
Piston and rod	Top carriage cylinder, No. 3	Forged steel	2			4	Male buffer forged solid with rod.
Piston-head liners.	Piston head	Bronze, No. 4	8				
Piston-rod brackets	Bolted to chassis	Cast iron	2				Right and left.
Pipe connections	Equalizing pipes	Bronze	10				
Pipe-connection followers.	do	Bronze, No. 4	10				
Pipe-connection straps.	Bolted to top carriage	Wrought iron	4				
Pipe-connection steel ring.	On equalizing pipes	Steel	10				
Platform brackets.	Bolted to racer	Cast steel, No. 1	17				4 with offset base.
Platform brackets, inside.	Bolted to racer and chassis	Steel plate	2				Right and left.
Platform brace	Bolted to rear transom	Forged steel	1				
Platform, outside	Bolted to brackets	Steel plate	1				10 sections.
Platform, sighting.	Top of chassis	do	2				Right and left.
Platform bracket, sighting.	Bolted to sight standard	Cast steel, No. 1	1				
Racer	On traversing rollers	Cast steel	1				In two pieces.
Retaining washer	In elevating racket	Bronze	1				
Retraction crank	Retracting-crank shaft	Forged steel	2				With brass sleeve.
Retraction-crank shaft.	Through chassis	Forged steel, No. 2	1				5 keys, 2 collars, 1 taper pin.
Retraction-crank shaft bearings.	Bolted to chassis	Forged steel	2				
Retraction drum	Retraction-drum shaft	Forged steel, No. 2	2				4 rope clamps.
Retraction-drum shaft bearing.	Bolted to chassis	Forged steel	2				
Retraction-drum shaft.	Through chassis	Forged steel, No. 2	1				6 keys, 2 taper pins.
Retraction-drum gear.	Drum shaft	Cast iron, No. 2	1				
Retraction gear	On second pinion drum shaft	do	1				90 teeth, 1.257" pitch.
Do	On third pinion drum shaft	do	1				64 teeth, 1.675" pitch.

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Names of parts.	Location.	Material.	Number.	Diameter.	Length.	Notes.	Remarks.
Retraction, first pinion.	Retracting-crank shaft.	Bronze, No. 3.	1	Inches.	In.		22 teeth, 1.287" pitch.
Retraction, second pinion.	Retraction-drum shaft.	do	1				20 teeth, 1.676" pitch.
Retraction, third pinion.	Retraction-crank shaft.	Forged steel.	1				11 teeth, 2.513" pitch.
Retraction, ratchet pawl.	On ratchet pawl pin.	do	1				
Retraction, ratchet pawl pin.	Screwed into chassis.	do	1				
Retraction, ratchet pawl wheel.	Retraction-crank shaft.	do	1				
Retraction ropes.	Clamped to retraction drums.	do	2	.75	34		
Retraction-rope clamp.	Bolted to drums.	do	4				
Retraction-rope sheaves.	In buffer brackets.	Cast iron, No. 2	2				
Retraction-rope trough.	Bolted to carriage.	Steel plate.	2				
Retraction-rope trough angle.	Buffer bracket.	Wrought iron.	2				
Retraction-rope loop.	Retraction rope.	Forged steel.	2				
Retraction-rope trough bracket.	Bolted to rear transom.	Cast iron.	2				
Retraction-rope trough support.	Bolted to chassis.	do	2				
Rocker bracket.	On sight standard.	Cast steel.	1				
Roller bearings.	Retraction-crank shaft.	Bronze and steel.	2				
Do.	Retraction drum shaft.	do	2				
Do.	Retraction-rope sheaves.	do	2				
Do.	Second pinion.	do	1				
Do.	Third pinion.	do	1				
Rollers, recoil.	On chassis.	Forged steel, No. 3.	26				2 with large holes.
Rollers, axles, recoil.	Through side frames and rollers.	do	24	1.5	17	24	
Do.	do	do	2	2	17	2	
Roller cages.	On roller axles.	Cast steel, No. 2	2				
Safety latch.	On latch fulcrum.	Forged steel.	2				
Safety-latch dog.	On crosshead.	do	2				
Safety-latch fulcrum.	In chassis.	do	2				
Safety-latch stop.	Driven into chassis.	do	2				
Screen.	On sighting platform.	Steel.	1				
Screws, counter-sunk head.	Name and direction plates.	Brass.	58	.25	.5		
Do.	Graduated scales.	German silver.	14	.25	.5		
Do.	Liner to racer.	Bronze.	50	.75	1		
Do.	Axle-bed bushing.	do	48	.75	1.125		
Do.	Trunnion-bed bushing.	do	24	.75	1.125		
Do.	Index to slide and nut.	Brass.	1	.25	.7		
Do.	Lid to azimuth pointer hole.	Bronze.	5	.5	1.125		
Do.	Platform plate and cover.	do	216	.75	1		
Do.	Azimuth circles.	do	60	.5	1.125		
Screw-driver cross handle.	Platform screws.	do	2				With 12 blades.
Screw-driver.	General use.	Steel.	2				
Screws, square head.	Retraction collars.	do	2	.875	2		Wooden handle.
Do.	Elevating pin.	do	1	2	5		
Screws, hex head.	Leveling base ring.	Bronze.	12	1.75	5		
Sheave pins.	Through buffer bracket.	Steel.	2				2 tap bolts.
Sight-arm link.	Sight standard.	do	1				2" cold-drawn seamless steel tube, 12" thick, 2 forked ends forged steel forced, 4-.375" rivets steel, 1-1.5" pin.

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Names of parts.	Location.	Material.	Number.	Diameter.	Length.	Num.	Remarks.
				Inches.	In.		
Sight-elevating arm.	Sight standard	Steel	1				2.5" cold-drawn seamless steel tube 1.56" thick, 4-.375" steel rivets, 1-1.5" x 4" pin bronze, 1 upper forked end bronze, 1 lower forked end steel.
Sight-elevating arm fulcrum.	Sight-elevating arm ..	Bronze	2	1.5	4.25		
Sight-elevating shaft bearing.	Bolted to miter-box cover.	do	1				
Sight-elevating bevel gear.	On elevating shafts ..	1 bronze					22 teeth.
Sight-elevating screw.	In sight standard	1 steel					18 teeth.
Sight-elevating screw-adjusting nut.	On sight-elevating screw.	Steel	1	1.75			.26" pitch.
		do	1	2			Split for clamping 1-.5" x 1" set screw, 1 bronze washer.
Sight elevating gear-box cover.	Sight elevating gear box.	Cast iron	1				
Sight elevating slide.	Sight standard	Bronze	1				2-pin trunnions, bronze.
Sight standards ...	Sighting platform	Cast steel, No. 2	1				
Speed crank	Retraction crank shaft.	Steel	2				
Standards	Bolted to racer	Cast steel, No. 1	2				Right and left.
Stiffener	Under platform	Steel	1				
Studs	Cylinder heads	do	32		5.5	32	
Do	Cap to rear transom ..	do	2	1.25	10.125	4	
Do	Gun-lever axle cap	do	8	3	14.75	16	
Do	Gun-lever cap squares ..	do	4	3	15.75	8	
Do	Yoke to gun levers	do	8	2.5	10.25	8	
Stuffing boxes	Front end of cylinder ..	Bronze, No. 4 ..	2				
Suspension rods ...	Suspended from cross-head.	Forged steel, No. 3.	4				
Throttling bar	In recoil cylinders	do	4				
Throttling valve ..	Top carriage	Steel	1				
Throttling valve stem.	Throttling valve yoke ..	Bronze, No. 3 ..	1				Steel end driven onto it.
Throttling valve gland.	Body of valve	Bronze	1				
Throttling valve latch.	do	do	1				
Throttling valve padlock.	Yoke of valve	do	1				Yale, No. 853.
Throttling valve yoke.	Body of valve	Bronze, No. 3 ..	1				
Throttling valve tubes.	Recoil cylinder to carriage.	Steel	2				Pinned to cylinders.
Transom, front	Bolted to chassis	Cast steel, No. 1	1				
Transom, rear	do	do	1				
Transom cap	On rear transom	do	1				
Traversing bracket.	Bolted to chassis	Cast steel	1				
Traversing bevel gear.	Traversing intermediate shaft.	Cast iron, No. 2	1				45 teeth, 2.5 per inch.
Traversing bevel pinion.	Traversing shaft	Bronze	1				15 teeth, 2.5 per inch.
Traversing brake clamp and bracket.	Bolted to racer	Cast steel	1				
Traversing brake handle.	Traversing brake	Forged steel ..	1				
Traversing brake nut.	do	Bronze	1				
Traversing brake screw and shoe.	do	Tool steel	1				
Traversing crank ..	Traversing crank shaft.	Forged steel ..	2				With brass sleeve.
Traversing intermediate bevel gear.	Traversing pinion shaft.	Bronze, No. 3 ..	1				45 teeth, 2.5 per inch.
Traversing intermediate bevel pinion.	Traversing intermediate shaft.	Steel	1				14 teeth, 2 per inch.

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Names of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Traversing intermediate bracket.	Bolted to chassis.....	Cast steel, No. 2	2	Inches.	Ina.		Different shapes.
Traversing intermediate shaft.	Through traversing intermediate brackets.	Forged steel No. 2.	1				2 collars, 2 taper pins.
Traversing pinion.	Traversing pinion shaft.	Bronze, No. 3.	1				14 teeth 2.004" pitch.
Traversing pinion shaft.	In traversing pinion..	Steel.....	1				
Traversing pinion shaft bearing.	Bolted to racer.....	Cast steel, No. 1	1				
Traversing pinion shaft friction disks.	On pinion shaft.....	Cast iron.....	3				
Traversing pinion shaft friction nut.	.....do.....	Steel.....	1				With bronze collar.
Traversing pinion shaft friction ring.	.....do.....	Bronze.....	1				
Traversing rack...	Bolted to base ring...	Forged steel, No. 1.	1				234 teeth in pieces as convenient.
Traversing rollers.	On base ring.....	Forged steel, No. 2.	24				
Traversing roller bearings.	Bolted to distance ring.	Bronze, No. 3.	48				
Traversing shaft...	Through chassis.....	Steel.....	1				3 collars, 3 taper pins, 3 keys, and 2 split pins.
Traversing stops...	Bolted to base ring...	Wrought iron.	2				
Tripping crank...	Tripping shaft.....	Forged steel, No. 3.	2				
Tripping crank pin	Tripping crank.....	.....do.....	2				2 collars, 2 rollers, 2 pins.
Tripping lever.....	Tripping shaft.....	Forged steel..	2				
Tripping-lever buffer.	Bolted to platform ..	.....do.....	2				
Tripping shaft.....	Through chassis.....	.....do.....	2				2 leathers, 2 keys
Top carriage.....	On recoil rollers.....	Cast steel, No. 2	1				
Tool hooks.....	On chassis.....	Wrought iron.	8				
Wrenches, box.....	Buffer and cylinder heads.	Steel.....	1				
Wrenches, double.	0.5" and 0.625" nuts...	.....do.....	1				
Do.....	1" and 1.25" nuts.....	.....do.....	1				
Do.....	1.5" and 1.75" nuts.....	.....do.....	1				
Do.....	2" and 2.5" nuts.....	.....do.....	1				
Do.....	3" and 3.5" nuts.....	.....do.....	1				
Do.....	Elevating band trunnions.	.....do.....	1				6.25" and 7.625".
Wrenches, single..	Piston-rod nuts.....	.....do.....	1				6.125".
Do.....	Filling and vent plugs	.....do.....	1				1.25".
Wrenches, spanner	Stuffing boxes.....	.....do.....	2				
Wrenches, monkey	General use.....	.....do.....	1		12		
Wrenches, socket, with driver.	Traversing roller bolts.	.....do.....	1				

COCKING MECHANISM.

Cocking arm.....	Cocking shaft.....	Bronze.....	1				
Cocking crank....	Cocking rocker.....	Forged steel..	1				
Cocking connection.	Between cocking handles.	Seamless tube	1				Ends forged steel.
Cocking and firing rocker.	Cocking shaft.....	Bronze.....	1				Right and left.
Cocking handle...	Cocking-handle guide	Steel.....	1				
Cocking-handle guide.	Cocking handle.....	Steel plate....	1				
Cocking handle, lower.	In bracket.....	Bronze.....	1				
Cocking shaft.....	Through cocking arm.	Forged steel..	1				
Cocking spring....	Cocking mechanism..	.....do.....	1				
Firing connection.	Between triggers.....	Steel.....	1				Seamless steel tube.
Firing shaft.....	Through trigger.....	.....do.....	1				Do.
Firing spring.....	Firing mechanism....	.....do.....	1				

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

COCKING MECHANISM—Continued.

Names of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inches.	In.		
Lower trigger and guard.	Firing shaft	Bronze	1				
Magneto-box bracket.	Sight standard	do	1				
Sheaves	do	do	2				
Sheave pin	Through sheaves	Steel	2				
Spring bracket	Sight standard	do	1				
Spring collar	Cocking mechanism	do	2				
Trigger and guard.	Firing mechanism	Bronze	1				

ELECTRICAL APPARATUS.

Controller extension.	Top of controllers	Steel	2				Different lengths.
Controller extension bracket.	Bolted to sight standard.	Cast steel, No. 1	1				1 bronze bushing.
Controller handle.	On controllers	Bronze	5				
Controller miter boxes.	Bolted to platform	do	2				
Controller miter gears.	In miter boxes	do	4				
Controller shippers.	Controller shipper shaft.	Steel	2				
Controller shipper arc.	do	Cast iron, No. 2	1				124 teeth, 8 per inch.
Controller shipper bracket.	Bolted to racer	Cast steel	1				
Controller shipper cams.	Bolted to base ring	Steel	2				
Controller shipper pinion.	Controller shaft	Cast iron, No. 2	1				
Controller shipper shaft.	In controller shipper bracket.	Forged steel, No. 2.	1				
Controller standard.	On platform	Steel	1				
Elevating controller.	Bolted to standard	Iron and bronze.	1				
Elevating gear	On elevating shaft	Steel	1				
Elevating idler	Maneuver lever	Bronze	1				
Elevating idler shaft.	Elevating idler	Steel	1	1.5	6.625	1	
Elevating motor.	Elevating motor bracket.	Steel and copper.	1				Used for retracting.
Elevating motor bracket.	Bolted to chassis	Cast iron	1				
Elevating motor pinion.	Elevating motor shaft.	Steel	1				14 teeth.
Elevating motor shaft.	do	do	1				
Maneuver lever	Motor shaft	Cast steel	1				
Maneuver lever arc.	Bolted to chassis	Steel	2				
Maneuver lever arc stud.	Through chassis	do	2				
Maneuver lever bushings.	In maneuver lever	Bronze	1				
Maneuver lever lock bolt.	Chained to lever	Steel	1				
Retracting gear	On retracting crank shaft.	Cast steel	1				124 teeth, 4 per inch.
Traversing controller.	Bolted to standard	Steel and bronze.	1				
Traversing motor.	Bolted to bracket	Steel and copper.	1				
Traversing motor bracket.	Bolted to chassis	Cast steel	1				
Traversing motor gear.	Traversing shaft	do	1				86 teeth, 4 per inch.
Traversing motor pinion.	Motor shaft	Steel	1				18 teeth, 4 per inch.
Traversing motor shaft.	In motor	do	1				

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

AMMUNITION TRUCKS.

(Prices of ammunition truck separately, \$—.)

Names of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inches.	In.		
Arm	Holding handle	Steel	2				
Axles	Holding truck	Forged steel, No. 2	1				
Bevel gears	Elevating screw	Cast iron	2				
Bracket	On tray	Bronze	1				
Brake lever	Brake shaft	Steel	1				
Brake lever spring	Brake lever	do	1				
Brake shaft	In shaft bearing	do	1				
Do	Riveted to frame	do	2				
Brake shoe	On brake shoe	Cast iron	2				0.25" taper pin.
Cartridge pans	Riveted to frame	Steel	2				
Caster bracket	do	Bronze	1				
Caster wheel	In caster yoke	Cast steel	1				
Caster-wheel pin	In caster wheel	Forged steel	1				
Caster yoke	In caster bracket	Cast steel	1				
Collar	On crank	Forged steel	1				
Do	On caster yoke	do	1				
Crank	In caster bracket	do	1				
Elevating nut	In plunger sleeve	Bronze	1				
Elevating screw	In elevating nut	Forged steel	1				
Handle	Through arms	Wood	1				Ash.
Key	Plunger sleeve	Steel	1				
Plunger	In plunger sleeve	Wrought iron	1				5" wrought-iron pipe.
Plunger sleeve	Riveted to frame	Bronze	1				
Shot tray	Top of truck	Steel	1				
Shot tongs .....	.....	Forged steel	1				7 pairs to each carriage.
Step bracket	Bottom plunger sleeve	Bronze	1				
Step washer	Step bracket	Forged steel	1				
Stop	Shot tray	Wrought iron	1				
Stop piece	Plunger sleeve	Steel	1				
Stop support	Shot tray	Wrought iron	1				
Tipping arm	Riveted to plunger	Bronze	1				
Tipping bolt and nut	Through tipping arm and plunger	Forged steel	1				
Tipping hand wheel	On tipping arm	Bronze	1				
Tipping nut	Tipping arm	Steel	1				
Tray support	Under tray	Bronze	1				
Truck wheels	On axle	Cast steel	2				

NOTE.—When new firing arrangement is perfected it will probably be necessary to revise list of cocking mechanism. Copies of list will be furnished for insertion.

SPARE PARTS FOR CARRIAGES.

The following spare parts for 12-inch carriages are issued to the service, to wit:

	Price each.			
	Dia. 1896.	Dia. 1897.	Dia. 1901.	Barb. 1892.
1 set gaskets, small, per carriage	\$2.24	\$3.48		\$3.00
1 set gaskets, large, per carriage	1.50	3.00		3.08
1 set filling plugs per carriage .....	.50	.50		.50
1 set springs, except counter-recoil springs and pawl-buffer springs, per carriage	18.00			
1 pawl safety-latch spring per carriage				
1 crosshead-pawl spring per carriage		1.50		
1 brake-lever spring per carriage				
1 compression-grease-cup spring per carriage .....		.10		
1 ratchet ball-bearing spring per carriage				
1 set hydraulic packing per carriage .....	.50	.50		
1 set off-hole plugs per carriage .....	.10	.10		.10
1 set elevation-pointer dowels per carriage .....	.10	.10		
1 set throttling-bar bolts per post .....	.80	.83		.83
1 set rear stuffing-box studs per post .....	.35	.35		
1 set elevator-pointer screws per post .....	.10	.10		.12
1 set taper pins per post .....	.25	.25		.25

a Indicator arc and rack screws.

SPARE PARTS FOR CARRIAGES—Continued.

	Price each.			
	Dis. 1896.	Dis. 1897.	Dis. 1901.	Barb. 1892.
1 set taper keys per post.....each.....		\$0.25		
1 set split pins per each model of carriage.....do.....	\$0.02	.02		\$0.02
1 set roller bearings per each model of carriage.....per set.....	292.90	263.45		
1 set wire retraction ropes per each model of carriage.....each.....	6.25	8.25		6.18
1 set parts of equalizing and pipe-throttling device, complete, per each model of carriage.....				
1 set bolts for rope clamp per each model of carriage.....each.....	.10	.05		
1 set screws for floor plates per each model of carriage.....do.....	.80	.80		
1 set clamp screws for right holder per each model of carriage.....do.....	.50	.50		
1 set dust-guard bolts per each model of carriage.....do.....	.05	.10		.05
1 set platform-ladder bolts per each model of carriage.....do.....	.10	.10		.10
1 set ball bearings per each model of carriage (retain at arsenal).....per set.....	10.50	16.00		12.65
1 set springs, each model ammunition truck, per post.....each.....	.25	.25		
1 handle for ammunition truck.....	1.25	1.25		
1 set of rivets for same per post.....	2.50	2.50		
1 set extractors for cylinder heads per each model of carriage.....	.50	.50		
1 set extractors for stuffing boxes per each model of carriage.....				.50
1 set traversing stops, except 12-inch D. C., model 1896 and 1897, per post.....each.....	6.00	6.00		2.00
1 set elevating stops, except 12-inch D. C., model 1896, per post.....do.....	8.00	6.00		9.00
1 set crosshead-pawl stops per post.....				
1 set safety-latch stops per post.....each.....	1.50	.50		
1 set stops for elevating clamps per post.....				
1 set emptying plugs for each model carriage.....each.....	1.00			.50
1 set Yale locks, No. 853 (standard padlock), per post.....	1.00	1.00		
1 set drain plugs for elevating and traversing brackets and castings per post.....each.....	.50			
1 set balata washers per post.....do.....				
1 set cables for electric firing apparatus per post.....				
1 set crane ropes for barbette carriages per carriage.....				4.60
1 set screws for name and direction plates per post.....each.....	.08	.08		.08
2 dozen hexagonal nuts, assorted, U. S. S., $\frac{1}{2}$ to $1\frac{1}{2}$ inch, per post.....per doz.....	1.92	1.92		1.92

NOTE.—A complete set of these parts as far as applicable to carriages mounted at any post should be kept on hand, except equalizing and pipe throttling device, roller, and ball bearings, which will be issued to the district armament offices to be retained at arsenals.

In ordering parts of any carriage, always specify the kind, model, and number of carriage to which the part belongs.

MAKING REQUISITION FOR SPARE PARTS.

In making requisitions for spare parts for either gun or carriage, the nomenclature given in this manual must be strictly followed. The failure to do so makes it difficult to always determine at the issuing arsenal exactly what parts are to be ordered issued, and the failure to do so may cause serious delay in the action on the requisition.

When spare parts or tools for either seacoast or rapid-fire guns or carriages are called for to replace unserviceable parts or tools, the unserviceable parts or tools, after repairs or exchanges are made, should be sent to Watervliet and Watertown arsenals, respectively, for gun and carriage parts.

MODEL OF 12-INCH GUNS REQUIRED FOR VARIOUS MODELS OF 12-INCH CARRIAGES.

Model and number of carriage.			Model of gun required.	Remarks.
Kind.	Model.	Numbers.		
Disappearing	L. F., 1897.	All of this model....	Either 1888, 1888 Mi, 1888 Mi $\frac{1}{2}$, 1888 MII, 1895, 1895 Mi.	On account of the relative number of rifles of each model, no rifles of model 1888 will be issued for these carriages.
Do.....	L. F., 1896.	Nos. 11 to 15, both inclusive.	Either 1888, 1888 Mi, 1888 Mi $\frac{1}{2}$, 1888 MII, 1895, 1895 Mi.	Bands for both models of guns have been made for these carriages.
Do.....	L. F., 1896.	Nos. 1 to 10, both inclusive; Nos. 16 to 70, both inclusive.	Either 1888, 1888 Mi, 1888 Mi $\frac{1}{2}$, and 1888 MII only.	Account eight standard being on the right-hand side of carriage.
Do.....	L. F., 1896.	Nos. 71 to 74, both inclusive.	Either 1888, 1888 Mi, 1888 Mi $\frac{1}{2}$, 1888 MII, 1895, 1895 Mi.	Special elevating bands required for guns of model 1888 and modifications.
Barbette.....	1892.....	All of this model....	Either 1888, 1888 Mi, 1888 Mi $\frac{1}{2}$, and 1888 MII only.	Model 1895 rifles can not be mounted on these carriages on account of great muzzle preponderance.
Disappearing	L. F., 1901.	.....	.....	.....

NOTE.—For annual allowance of paints and material for cleaning and preservation, see Supply Table, pages 359 and 360.

For further details as to instructions for care, etc., see pamphlets issued by Ordnance Department, "Instructions for mounting, etc., disappearing carriage, L. F., Model 1896, for 12-inch B. L. Rifle;" "Instructions for mounting, etc., disappearing carriage, L. F., Model 1897, for 12-inch B. L. Rifle."

CONTENTS OF ARMAMENT CHEST FOR 12-INCH B. L. RIFLE, MODELS 1888, 1888 Mi, 1888 Mi $\frac{1}{2}$, 1888 MII.

(1 armament chest \$52.00.)

	Price each.		Price each.
1 bar screw-driver for breech-plate screws	\$1.50	1 gunner's reamer	\$1.00
1 bar screw-driver for hinge-pin oil hole, breechblock oil hole, rotating handle and sight, and lock-plate screws	.75	1 cleaning reamer for primer seat	1.00
1 bar screw-driver for tray back-latch catch, breech-plate oil hole, spring-bolt shoe, tray-latch catch, hinge-pin securing and tray-lock screws	.75	1 gunner's gimlet	.55
1 bar screw-driver for tray back-latch pivot, bronze bushing, vent-cover pivot, translating stud, and latch pin for tray-lock screws	.75	1 gunner's pouch	2.50
1 tool for unscrewing housing of crank catch	2.00	1 pair gunner's sleeves	per pair.. 1.18
1 extension-pipe handle (used with some guns)	.60	1 gunner's lanyard	1.15
1 obturator-nut wrench	6.00	1 loading tray	19.75
1 obturator-nut clamp-screw wrench	4.44	1 metal scraper	.43
1 locking-nut washer	2.60	12 silk wipers, or cotton waste	.10
1 primer key	1.50	4 balls twine, assorted	per pound.. .16
1 pin punch	.30	2 pounds copper wire, No. 12	do.... .20
1 tit wrench for obturator spindle	1.00	2 pounds copper wire, No. 16	do.... .20
1 bronze drift (large)	.40	1 quire emery cloth, No. 00	.44
1 bronze drift (small)	.25	3 wagon sponges	per pound.. 2.28
1 pressure-plug wrench	1.90	1 file, flat, dead smooth	.13
1 ring for lifting breech plate	.75	1 file, round, second cut	.07
1 gunner's punch	.90	1 file, half round, smooth	.13
		1 file, three-cornered	.08
		1 copper hammer	1.25
		1 boiler maker's hammer	.75
		1 hand mallet	.16
		1 long-handled mallet	.60
		2 oilers, half pint	.13
		1 pair cutting pliers	.60
		1 monkey wrench, 12-inch	.52
		1 monkey wrench, 18-inch	1.12

CONTENTS OF ARMAMENT CHEST FOR 12-INCH B. L. RIFLE, MODEL 1885 AND MODEL 1900.

(1 armament chest \$52.00.)

	Price each.		Price each.
1 bar screw-driver for spline screw, oil-hole screw, and tray-latch catch screw.	\$0.75	1 metal scraper (for removing paint, etc.).	\$0.43
1 bar screw-driver for vent-cover screw.	.75	12 silk wipers, or cotton waste a.....	.10
1 commercial screw-driver for spindle ball-bearing screws.....	.40	4 balls twine, assorted.....per pound..	.16
1 obturator-nut wrench.....	6.65	2 pounds copper wire, No. 12.....do.....	.20
1 obturator-nut clamp screw wrench.....	4.44	2 pounds copper wire, No. 16.....do.....	.20
1 locking-nut washer.....	2.60	1 quire emery cloth, No. 00.....	.44
1 primer key.....	1.50	3 wagon sponges.....per pound..	2.38
1 pin punch.....	.30	1 file, flat, dead smooth.....	.13
1 tit wrench for obturator spindle.....	1.00	1 file, round, second cut.....	.07
1 pressure-plug wrench.....	1.90	1 file, half round, smooth.....	.13
1 bronze drift (large).....	.40	1 file, three-cornered.....	.08
1 bronze drift (small).....	.25	1 copper hammer.....	1.25
1 gunner's punch.....	.90	1 boiler maker's hammer.....	.75
1 gunner's reamer.....	.75	1 hand mallet.....	.16
1 cleaning reamer for primer seat.....	1.00	1 long-handled mallet.....	.60
1 gunner's gimlet.....	.55	2 ollers, half pint.....	.13
1 gunner's pouch.....	2.50	1 pair cutting pliers.....	.60
1 pair gunner's sleeves.....	1.18	1 monkey wrench, 12-inch.....	.52
1 gunner's lanyard.....	1.15	1 monkey wrench, 14-inch.....	1.12
1 loading tray.....	19.75	1 wrench for bronze bushing and hinge-pin nut.....	.75

CONTENTS OF IMPLEMENT CHEST FOR 12-INCH GUNLIFT CARRIAGE, MODEL 1891; AND ALTERED GUNLIFT CARRIAGE, MODEL 1894.

	Price each.		Price each.
2 screw eyes for extracting follower in stuffing box.....		1 double wrench for 1½-inch and 1-inch nuts.....	
1 screw-driver for dust guard.....		1 single wrench for 1½-inch nuts.....	
1 screw-driver for elevating rack.....		1 single wrench for 1½-inch nuts.....	
1 spanner wrench for stuffing box.....		1 single wrench for 2-inch nuts.....	
1 wrench for valve-box cap.....		1 crane rope and block.....	
1 box wrench for friction clamp.....		1 oiler, 1 quart.....	
1 box wrench for elevating rack.....		The following articles being too large are not to be kept in the chest:	
1 double wrench for pipe connection.....		2 water buckets, indurated fiber.....	
1 double wrench for ½-inch and ¼-inch nuts.....		2 wrenches for piston-rod nuts.....	
1 double wrench for ½-inch and ¼-inch nuts.....		1 box wrench for clips.....	
1 double wrench for 1-inch and 1½-inch nuts.....			

CONTENTS OF IMPLEMENT CHEST FOR 12-INCH BARNETTE CARRIAGE, MODEL 1892.

	Price each.		Price each.
1 box wrench for friction-clamp nut.....		1 double wrench for elevating apparatus.....	
1 box wrench for elevating rack.....		1 single wrench for 1-inch nuts.....	
1 wrench for stuffing-box gland.....		1 single wrench for 1½-inch nuts.....	
1 wrench for scroll spring.....		1 single wrench for 1½-inch nuts.....	
1 screw-driver for journals for recoil rollers.....		1 single wrench for 2-inch nuts.....	
1 screw-driver with wooden handle.....		1 oiler, 1 quart.....	
1 screw-driver for elevating rack.....		The following articles being too large are not to be kept in the chest:	
1 screw-driver for dust guard.....		1 box wrench for guide hooks.....	
2 screw eyes for extracting follower in stuffing box.....		1 box wrench for rear cylinder cover.....	
1 double wrench for loading platform and throttling bars.....		2 wrenches for piston-rod nuts.....	
1 double wrench for ½-inch and ¼-inch nuts.....		2 water buckets, indurated fiber.....	

*10 pounds of cotton waste will be issued in lieu of 12 silk wipers.

CONTENTS OF IMPLEMENT CHEST FOR 12-INCH DISAPPEARING CARRIAGE, L. F.,
MODEL 1896.

Price each.	Price each.
1 double wrench for 2-inch and 2½-inch nuts	1 box wrench for filling vent and drain plugs
1 double wrench for 1½-inch and 1¾-inch nuts	The following articles being too large are not to be kept in the chest:
1 double wrench for 1-inch and 1¼-inch nuts	2 pinch bars
2 spanner wrenches for stuffing boxes	2 wrenches for piston-rod nuts
3 S hooks for lifting counterweights	1 wrench for elevating friction nuts
1 oiler, 1 quart	1 double wrench for 3-inch and 3½-inch nuts
1 double screw-driver	2 water buckets, indurated fiber
1 box wrench for buffer-cylinder heads ..	

CONTENTS OF IMPLEMENT CHEST FOR 12-INCH DISAPPEARING CARRIAGE, L. F.,
MODEL 1897.

Price each.	Price each.
1 double wrench for 1-inch and 1½-inch nuts	2 cross-handled screw-drivers with 12-inch blades
1 double wrench for 1½-inch and 1¾-inch nuts	1 monkey wrench, 12-inch
1 double wrench for 2-inch and 2½-inch nuts	3 S hooks for lifting counterweight
2 spanner wrenches for stuffing boxes ..	1 screw-driver for traversing-rack bolts ..
1 box wrench for buffer-cylinder head ..	The following articles being too large are not to be kept in the chest:
1 box wrench for filling vent and drain plugs (for carriages Nos. 1 to 22, inclusive)	2 pinch bars (top carriage "in batteries").
1 fork wrench for filling vent and drain plugs (for all carriages after No. 22)	1 single wrench for piston-rod nuts
1 oiler, 1-quart	1 double wrench for piston-rod nuts and elevating-band trunnions
2 oilers, ½-pint	1 double wrench for 3-inch and 3½-inch nuts
	2 water buckets, indurated fiber

CONTENTS OF COMBINATION ARMAMENT CHEST FOR 12-INCH B. L. RIFLE, MODEL 1895,
AND 12-INCH DISAPPEARING CARRIAGE, L. F., MODEL 1897.

For Rifle.

(For prices of tools, etc., see page 181.)

Price each.	Price each.
1 bar screw-driver for spline screw, oil-hole screw, and tray latch-catch screw.	1 gunner's punch, for vent
1 bar screw-driver for vent-cover screw ..	1 gunner's reamer, for vent
1 commercial screw-driver for spindle ball-bearing screws	1 gunner's gimlet, for vent
1 obturator-nut wrench	1 gunner's pouch
1 locking-nut washer	1 pair gunner's sleeves
1 primer key	1 gunner's lanyard
1 loading tray	1 wrench for hinge-pin nut and bronze bushing
1 tit wrench for obturator spindle	1 metal scraper (for removing paint, etc.) ..
1 pressure-plug wrench	1 quire emery cloth, No. 00
1 pin punch	3 wagon sponges
2 bronze drifts	2 pounds copper wire, No. 12
4 balls twine, assorted	2 pounds copper wire, No. 16
1 file, flat, dead smooth	12 silk wipers or cotton waste ^a
1 file, round, second cut	1 boiler maker's hammer
1 file, half round, smooth	1 hand mallet
1 file, three-cornered	1 long-handled mallet
1 copper hammer	1 monkey wrench, 18-inch
	1 pair cutting pliers

^a 10 pounds of cotton waste will be issued in lieu of 12 silk wipers.

For Carriage.

	Price each.		Price each.
1 oiler, 1 quart.....		2 cross-handled screw-drivers with 12 blades	
2 oilers, $\frac{1}{2}$ pint.....		3 S hooks for lifting counterweights	
1 double wrench for 1-inch and $1\frac{1}{4}$ -inch nuts		1 screw-driver for traversing-rack bolts ..	
1 double wrench for $1\frac{1}{4}$ -inch and 1 $\frac{1}{2}$ -inch nuts		1 monkey wrench, 13 inches.....	
1 double wrench for 2-inch and $2\frac{1}{4}$ -inch nuts		The following articles, being too large, are not to be kept in the chest:	
2 spanner wrenches for stuffing boxes ...		2 pinch bars (top carriage "in battery")..	
1 box wrench for buffers, cylinder head..		1 single wrench for piston-rod nuts	
1 box wrench for filling vent and drain plugs (for carriages Nos. 1 to 22, inclu- sive).....		1 double wrench for elevating-band trun- nions and piston-rod nuts	
1 fork wrench for filling vent and drain plugs (for all carriages after No. 22)....		1 double wrench for 2-inch and $2\frac{1}{4}$ -inch nuts	
		2 water buckets, indurated fiber	

The combination tool chest for the 12-inch B. L. rifle, model 1895, mounted on disappearing carriage, L. F., model 1897, constructed recently, have been modified so they will answer as well for the 12-inch B. L. rifle, model 1900, mounted on disappearing carriage, L. F., model 1901, provision being made for the additional carriage tools.

All the tools issued for use with the 12-inch B. L. rifle, model 1900, will be the same as those for the 12-inch B. L. rifle, model 1895. The tools for the 12-inch disappearing carriage, L. F., model 1901, are the same as those for the 12-inch disappearing carriage, L. F., model 1897, with the following additional tools for the former:

	Price each.
1 roller lift hook	
1 double wrench, $\frac{1}{2}$ " and $\frac{3}{4}$ " nuts.....	
1 socket wrench and screw-driver for traveling roller, bolts, and rock screws	

16-INCH B. L. RIFLE.

(Price of rifle, \$91,816.)

The official names of parts, the number, material, location, synonymous names, etc., for the 16-inch B. L. rifle are the same as for the 12-inch B. L. rifle, model 1895.





CHAPTER IV.

DESCRIPTION AND NOMENCLATURE OF PARTS OF 12-INCH B. L. MORTARS AND CARRIAGES.

LIST OF SPARE PARTS FOR ISSUE, ETC

12-INCH B. L. MORTAR, MODEL 1886.

(Price of mortar, \$3,872.)

INCLUDES MORTAR PROPER, BREECH MECHANISM, AND ATTACHED PARTS, AS PER
LIST BELOW.

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breech block, complete:					
Breechblock	1	Steel....	In breech	Interchangeable	Block.
Breechblock oil-hole screw	1	...do....	In breechblock.....	All mortars do not have this screw.	
Face plate.....	1	...do....	Screwed to breech-block.	Removable only at gun factory.	"Banjo."
Face plate screws, 4 long, 2 short.	6	...do....	Holds face plate to breechblock.	Interchangeable	Face-plate bolts.
Block handle.....	2	...do....	Riveted to face plate.	Not removable except at factory.	Breech block handle; face plate handle.
Translating stud	1	...do....	Dovetailed into face plate.	Not removable at post.	
Vent cover—					
Vent cover proper.	1	...do....	Covers vent	Interchangeable. In some mortars the vent cover is one piece.	Vent cover, lower part.
Vent cover bar....	1	...do....	In breech plate.....		Vent cover, upper part.
Vent cover screw..	1	...do....	Holds vent cover bar to vent cover proper.		
Rotating crank.....	1	...do....	On rotating-crank gear axle.	Interchangeable	
Rotating-crank bushing.	1	Bronze ..	In face plate.	Can not be inserted at fort.	
Rotating-crank nut .	1	Steel ...	On rotating-crank gear axle.	Interchangeable	
Rotating-crank nut pin.	1	...do....	In rotating-crank nut.	...do.....	
Rotating-crank gear.	1	...do....	On rotating-crank gear axle.	...do.....	Lower gear.
Rotating-crank gear axle.	1	...do....	In face plate .....	...do.....	Lower axle.
Rotating-crank gear nut.	1	Bronze ..	On inner end of rotating-crank gear axle.	...do.....	
Rotating-crank gear key.	1	Steel ...	Fastens rotating-crank gear to axle.	...do.....	
Rotating gear	1	...do....	Works in rotating segment.	...do.....	Upper gear.
Rotating-gear key...	1	...do....	Fastens rotating-gear to rotating pinion.	...do.....	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock—Cont'd.					
Rotating pinion	1	Bronze.	In upper end of face plate.	Interchangeable	Upper pinion.
Rotating-pinion nut.	1	...do....	On rotating pinion ...	...do....	
Rotating-pinion bushing, inner.	1	...do....	In front face of face plate.	Can not be inserted at fort.	
Rotating-pinion bushing, outer.	1	...do....	In rear face of face plate.	...do....	
Rotating-pinion nut pin.	1	Steel ...	In rotating-pinion nut.	Interchangeable	
Rotating-crank lock.	1	Bronze.	In face plate .....	...do....	
Rotating-crank lock spring.	1	Steel ...	On rotating-crank lock.	...do....	
Rotating-crank lock housing, outer.	1	Bronze.	Screwed into face plate.	...do....	
Rotating-crank lock housing, inner.	1	...do....	Screwed into outer housing.	...do....	
Obturator, complete: Obturator spindle, complete—					
Obturator spindle ..	1	Steel....	In breechblock.....	Interchangeable	Spindle, mushroom; also wrongly called obturator.
Obturator nut	1	...do....	On obturator spindle.	...do....	Obturator-spindle nut.
Obturator lock nut.	1	...do....	On obturator spindle, rear of obturator nut.	...do....	Lock nut.
Pressure-plug screws.	2	...do....	In face of obturator-spindle head.	...do....	
Pressure-plug washers.	2	...do....	On pressure-plug screw.	...do....	
Vent bushing, rear.	1	Copper.	Screwed into rear end of obturator spindle.	Not used in all mortars.	Vent piece.
Vent bushing, front.	1	...do....	Forced into obturator-spindle head.	Interchangeable	Do.
Firing attachment, complete—					
Slide housing.....	1	Steel....	On end of spindle ...	...do....	Housing.
Locking pin.....	2	...do....	In housing .....	...do....	Securing pins.
Locking-pin forks.	2	...do....	On top of pins .....	...do....	
Locking-pin fork pins.	2	...do....	Secure fork to pin .....	...do....	
Guide pin	1	...do....	On right of housing ..	...do....	
Ejector.....	1	...do....	Seated in housing .....	...do....	
Slide	1	...do....	In rear of housing....	...do....	
Slide handle.....	1	...do....	Part of slide .....	...do....	
Slide-spring stop...	1	...do....	In groove left side of housing.	Interchangeable	Slide catch.
Contact piece.....	1	...do....	Screwed to slide.....	...do....	
Contact-piece screws.	2	...do....	Secure contact piece to slide.	...do....	
Contact-piece insulation.	1	Vulcanized fiber.	.....	...do....	
Contact springs....	2	Brass ...	Riveted to contact piece.	...do....	
Contact binding screw.	1	...do....	Contact piece.....	...do....	
Contact binding-screw pin.	1	Steel....	Secures screw against coming out.	...do....	
Firing leaf.....	1	...do....	Pivoted to slide.....	...do....	Leaf.
Firing-leaf pivot.	1	...do....	.....	...do....	Leaf pin.
Firing-leaf springs.	2	...do....	.....	...do....	
Safety bars.....	1	...do....	On safety-bar arm ..	...do....	Vent shield.
Safety-bar arm	1	...do....	Seated on block .....	...do....	Vent shield body.
Safety-bar screws..	1	...do....	In safety bar .....	...do....	
Circuit breaker, complete—					
Circuit-breaker housing. ^b	1	Bronze.	On face plate.....	Interchangeable	
Circuit-breaker housing screws. ^b	4	Steel....	Secure housing to face plate.	...do....	
Circuit-breaker housing cap. ^b	1	Bronze.	On housing.....	...do....	
Circuit-breaker housing contact pin. ^b	1	...do....	In housing .....	...do....	

^a Replaces vent shield^b On face plate.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service shops, etc.
Obturator—Continued.					
Circuit-breaker complete—Cont'd.					
Circuit-breaker housing contact pin insulation. ^a	1	Vulcanized fiber.	Surrounds pin.....	Interchangeable	
Circuit-breaker housing clamp nut. ^a	1	Bronze.	Screws on pin	do	
Circuit-breaker housing. ^b	1	do	On breech of gun.....	do	
Circuit-breaker housing screws. ^b	2	Steel....	Secure housing to gun.	do	
Circuit-breaker housing cap. ^b	1	Bronze.	On housing.....	do	
Circuit-breaker contact pin. ^b	1	do	In housing	do	
Circuit-breaker contact-pin spring. ^b	1	Steel....	Actuates pin	do	
Circuit-breaker contact-pin insulation. ^b	1	Vulcanized fiber.	Surrounds pin.....	do	
Circuit-breaker contact clamp nut. ^b	1	Bronze.	Screws on pin	do	
Gas-check pad	1	Asbestos and tallow in canvas.	On obturator spindle	do	Pad, gas check.
Front split ring	1	Steel ..	Between gas-check pad and obturator spindle head.	do	Front exterior split ring.
Rear split ring	1	do	Between gas-check pad and filling-in disk.	do	Rear exterior split ring.
Small split ring	1	do	do	do	Interior split ring spindle ring.
Filling-in disk	1	do	Between gas-check pad and breech-block.	do	Disk.
Obturator-spindle washers.	2	do	Between obturator spindle and breech-block.	Interchangeable, except rear one (steel), which has flat face.	Antifriction washers.
	2	Bronze			
Tray, complete:					
Hinge pin, complete—					
Hinge pin.....	1	Steel....	Holds tray to hinge ..	Interchangeable	
Hinge-pin nut.....	1	do	On hinge pin.....	do	
Hinge-pin nut pin.	1	do	In hinge-pin nut	do	
Hinge-pin washer.	1	do	On hinge pin	do	
Translating roller...	1	do	In tray	do	Roller.
Translating crank...	1	do	On translating roller.	do	Roller crank.
Translating-crank nut.	1	do	do	do	Roller-crank nut.
Translating-crank nut pin.	1	do	In translating-crank nut.	do	Roller-crank nut pin.
Tray latch—					
Tray-latch body...	1	do	In tray	do	
Tray-latch handle, male.	1	do	In tray-latch body ..	Interchangeable; issued together.	
Tray-latch handle, female.	1	do	do		
Tray-latch handle pin.	1	do	In tray-latch handle ..	do	
Tray-latch pivot.....	1	do	Holds tray latch to tray.	Interchangeable	Tray-latch bolt.
Tray-latch pivot washer.	1	do	In tray-latch pivot	do	Tray-latch bolt washer.
Tray-latch pivot pin.	1	do	do	do	Tray-latch bolt pin.
Tray-latch catch	1	do	Screwed to breech.....	do	
Tray-latch catch screw.	1	do	Holds tray-latch catch to breech.	do	

^a On face plate.^b On breech of gun.

NOTE.—This firing mechanism is to be replaced by a new one. List of parts will be furnished for insertion when completed.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray—Continued.					
Tray-spring bolt.....	1	Steel or bronze.	In tray	Interchangeable; this method of locking used in some mortars.	
Tray-spring bolt spring.	1	Steel....	On tray-spring bolt.....	do	
Tray-spring bolt.....	1	Steel or bronze.	In tray	do	Spring lock for tray latch.
Tray-spring bolt spring.	1	Steel....	On tray-spring bolt.....	do	
Tray-spring boltshoe	1	do	In tray-spring bolt.....	do	
Tray-spring boltshoe screw.	1	do	do	do	
Tray.....	1	Bronze ..	Attached to breech...	Interchangeable ..	Console.
Tray plate.....	1	do	Screwed to tray	do	Tray bushing, tray cap.
Tray-plate screws ...	2	Steel....	Hold tray plate to tray.	do	Tray-bushing screws, tray-cap screws.
Tray back-latch catch.	1	do	Screwed to tray	do	Securing latch catch.
Tray back-latch catch nut.	1	do	On tray back-latch catch.	do	Securing latch catch nut.
Tray back-latch catch screw.	1	do	Screws tray back-latch catch to tray.	do	Do.

PARTS ATTACHED TO MORTAR PROPER, BUT REMOVABLE.

Hinge	1	Steel....	Screwed to breech...		Hinge block.
Hinge screws.....	8	do	Screw hinge to breech	Interchangeable ..	Hinge-block bolts, hinge-block screws.
Rotating-segment screws, 2 large, 2 small.	4	do	Hold rotating segment to breech.	do	Rotating-rack screws.
Rotating segment	1	do	Screwed to breech...	Can be fitted only at factory.	Rotating rack.
Tray back latch—Tray back-latch body	1	do	Attached to breech...	Interchangeable. The name of this is changed and is indefinite.	Securing latch body, securing latch.
Tray back-latch handle.	1	do	Attached to tray back-latch body.	Interchangeable ..	Securing latch handle, securing latch.
Tray back-latch handle pin.	1	do	In tray back-latch handle.	do	Securing latch handle pin, securing latch.
Tray back-latch bolt.	1	do	Hold tray back latch to breech.	do	Securing latch bolt.

12-INCH B. L. MORTAR, MODEL 1888, CAST-IRON BODY, STEEL HOOPED.

Weight, 14.25 gross tons (31,920 pounds).

Distance between rimbases, 44 inches.

Length of trunnions, 6 inches.

Distance of axis of trunnions from muzzle, 79.1 inches.

Total length, 129 inches.

Length of bore, 107.625 inches.

Maximum diameter of breech, 41.75 inches.

Diameter of muzzle, 22.5 inches.

Diameter of trunnions, 12 inches.

Powder chamber:

Diameter, 12.4 inches.

Length, 15.52 inches.

Capacity, 1,909 cubic inches.

Travel of projectile in bore, 7.66 calibers, 92.105 inches.

Projectile:

Kind.	Deck- piercing shell.	Torpedo shell.	Cast-iron shell.
Weight (filled).....pounds..	800 1,000	800 1,000	800 1,000
Ratio of weight to weight of piece.....	1-40 1-30	1-40 1-30	1-40 1-30
Weight of bursting charge, gun cotton...pounds..	22.1 89.4	67.7 84.6	12.5 19.6
Length.....calibers..	3.0 4.0	4.0 5.0	3.0 3.5
Sectional density $\frac{W}{r^2}$	7.08 8.94	7.08 8.94	7.08 8.94
Price each (without bursting charge and fuse)...	\$80, \$90	\$65, \$70	\$29, \$35.90

* Rifle powder.

Powder:

Kind, brown prismatic and smokeless, 12-inch mortar^a or siege gun and howitzer.

Weight, ^b 75.0 c pounds brown; ^b 41.5 c pounds smokeless.

Density of loading, 1.0272 brown; 0.5684 smokeless.

Muzzle velocity:

Brown, ^b 1,020 c feet per second.

Smokeless, ^b 1,200 c feet per second.

Maximum pressure per square inch:

Brown, ^b 27,500 c pounds.

Smokeless, ^b 28,000 c pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, ^b 8.2 c inches.

Smokeless, ^b 10.4 c inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, ^b 7.8 c inches.

Smokeless, ^b 9.5 c inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, ^b 7.3 c inches.

Smokeless, ^b 8.5 c inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, ^b 6.8 c inches.

Smokeless, ^b 8.1 c inches.

Muzzle energy:

Brown, ^b 5,769 c foot-tons.

Smokeless, ^b 7,986 c foot-tons.

Rifling:

Number of grooves, 68.

Width of grooves, 0.379 inch.

Depth of grooves, 0.07 inch.

Width of lands, 0.17498 inch.

Twist of rifling, one turn in 40 calibers at origin, increasing to one turn in 25 calibers at 16.525 inches from muzzle, being uniform over the 16.525 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

^a Kind of powder, varies with the range.

^b For 800-pound shell.

^c Maximum: The weight of charge varies with the range; for issues in bulk, the average charge is assumed to be three-fourths the maximum.

12-INCH B. L. MORTAR, MODEL 1890.

(Price of mortar, \$10,249.)

INCLUDES MORTAR PROPER, BREECH MECHANISM, AND ATTACHED PARTS, AS PER LIST BELOW.

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock.....	1	Steel....	In breech.....	Interchangeable....	Block.
Breechblock oil-hole screw.....	1	...do....	In breechblock.....	All mortars do not have this screw; are to be put on later.	
Face plate.....	1	...do....	Screwed to breechblock.	Removable only at gun factory.	"Banjo."
Face-plate screws, 2 long, 3 short.	6	...do....	Hold face plate to breechblock.	Interchangeable....	Face-plate bolts.
Block handle.....	1	Bronze ..	Riveted to face plate ..	...do.....	Face-plate handle.
Block-handle nuts....	2	Steel....	.....	Used with bronze handles.	Face-plate nuts.
Translating stud.....	1	...do....	Dovetailed into face plate.	Interchangeable....	
Vent cover—					
Vent cover proper.....	1	...do....	Covers vent.....	Can be fitted only at factory.	Vent cover, lower part.
Vent-cover bar.....	1	...do....	In face plate.....	...do.....	Vent cover, upper part.
Vent-cover screw.....	1	...do....	Holds vent-cover bar to vent-cover proper.	...do.....	
Rotating crank.....	1	...do....	Attached to rotating-crank gear axle.	Interchangeable....	
Rotating-crank bushing.	1	Bronze ..	In face plate.....	Interchangeable. These can not be inserted at fort.	
Rotating-crank nut....	1	Steel....	On rotating-crank gear axle.	Interchangeable....	
Rotating-crank pin....	1	...do....	In rotating-crank nut.	...do.....	
Rotating-crank gear.	1	Bronze ..	On rotating-crank gear axle.	...do.....	Lower gear.
Rotating-crank gear axle.	1	Steel ...	In face plate.....	...do.....	Lower-gear axle.
Rotating-crank gear nut.	1	Bronze ..	On inner end of rotating-crank gear axle.	...do.....	
Rotating-crank gear key.	1	Steel ...	Fastens rotating-crank gear axle.	...do.....	
Rotating gear.....	1	...do....	Works in rotating-assembly.	...do.....	Upper gear.
Rotating-gear key....	1	...do....	Fastens rotating gear to rotating pinion.	...do.....	
Rotating pinion.....	1	...do....	In upper end of face plate.	...do.....	Upper pinion.
Rotating-pinion nut.	1	...do....	On rotating pinion.	...do.....	
Rotating-pinion bushing, inner.	1	Bronze ..	In front face of face plate.	Interchangeable. Can not be inserted at fort.	
Rotating-pinion bushing, outer.	1	...do....	...do.....	...do.....	
Rotating-pinion nut pin.	1	Steel ...	In rotating-pinion nut.	Interchangeable....	
Rotating-crank lock housing,	1	...do....	Screwed into face plate.	Interchangeable. These parts used in some mortars.	
Rotating-crank lock front stud.	1	...do....	In face plate.....	...do.....	
Rotating-crank lock rear stud.	1	...do....	In rotating crank.....	...do.....	
Rotating-crank lock spring.	1	...do....	...do.....	...do.....	
Rotating-crank lock handle.	1	...do....	On rotating-crank lock rear stud.	...do.....	Wing nut.
Rotating-crank lock handle pin.	1	...do....	In rotating-crank lock handle.	...do.....	Wing-nut pin.
Rotating-crank lock.	1	Bronze ..	In face plate.....	...do.....	
Rotating-crank lock spring.	1	Steel ...	On rotating-crank lock.	...do.....	

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock—Cont'd.					
Rotating-crank lock housing, outer.	1	Bronze.	Screwed into face plate.	Interchangeable. These parts used in some mortars.	
Rotating-crank lock housing, inner.	1	...do....	Screwed into outer housing.	...do....	
Obturator, complete: Obturator spindle, complete—	1	Steel....	In breechblock.....	Interchangeable....	Spindle, mushroom; also wrongly called obturator.
Obturator spindle.	1	Steel....	In breechblock.....	Interchangeable....	Obturator-spindle nut.
Obturator nut.....	1	...do....	On obturator spindle.	...do....	Lock nut.
Obturator lock nut.	1	...do....	On obturator spindle, rear of obturator nut.	...do....	
Pressure-plug screw	2	Bronze.	In face of obturator-spindle head.	...do....	
Pressure-plug washers.	2	...do....	On pressure-plug screws.	...do....	
Vent bushing, rear.	1	Copper.	Screwed into rear end of obturator spindle.	...do....	Vent piece.
Vent bushing, front.	1	...do....	Forced into face of obturator spindle.	...do....	
Firing attachment, complete—					
Slide housing.....	1	Steel....	On end of spindle....	...do....	Housing.
Locking pins.....	2	...do....	In housing.....	...do....	Securing pins.
Locking-pin forks.	2	...do....	On top of pins.....	...do....	
Locking-pin fork pins.	2	...do....	Secure fork to pin....	...do....	
Guide pin.....	1	...do....	On right of housing..	...do....	
Ejector.....	1	...do....	Seated in housing....	...do....	
Slide.....	1	...do....	In rear of housing....	...do....	
Slide handle.....	1	...do....	Part of slide.....	...do....	
Slide-spring stop..	1	...do....	In groove left side of housing.	Interchangeable....	Slide catch.
Contact piece.....	1	...do....	Screwed to slide....	...do....	
Contact-piece screws.	2	...do....	Secure contact piece to slide.	...do....	
Contact-piece insulation.	1	Vulcanized fiber.	.....	...do....	
Contact springs....	2	Brass....	Riveted to contact piece.	...do....	
Contact binding screw.	1	...do....	Contact piece.....	...do....	
Contact binding-screw pin.	1	Steel....	Secures screw against coming out.	...do....	
Firing leaf.....	1	...do....	Pivoted to slide.....	...do....	Leaf.
Firing-leaf pivot..	1	...do....	.....	...do....	Leaf pin.
Firing-leaf springs.	2	...do....	On pivot.....	...do....	
Safety bars.....	1	...do....	On safety-bar arm....	...do....	Vent shield.
Safety-bar arm....	1	...do....	Seated on block.....	...do....	Vent shield body.
Safety-bar screws..	1	...do....	In safety bar.....	...do....	
Circuit breaker, complete—					
Circuit-breaker housing. ^b	1	Bronze.	On face plate.....	Interchangeable....	
Circuit-breaker housing screws. ^b	4	Steel....	Secure housing to face plate.	...do....	
Circuit-breaker housing cap. ^b	1	Bronze.	On housing.....	...do....	
Circuit-breaker housing contact pin. ^b	1	...do....	In housing.....	...do....	
Circuit-breaker housing contact pin insulation. ^b	1	Vulcanized fiber.	Surrounds pin.....	...do....	
Circuit-breaker housing clamp nut. ^b	1	Bronze.	Screws on pin.....	...do....	
Circuit-breaker housing. ^c	1	...do....	On breech of gun....	...do....	

^a Replaces vent shield.^b On face plate.^c On breech of gun.

NOTE.—This firing mechanism is to be replaced by a new one. List of parts will be furnished for insertion when completed.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Cont'd.					
Circuit-breaker, complete—Con.	2	Steel....	Secure housing to gun.	Interchangeable....	
Circuit-breaker housing screws. ^a	1	Bronze.	On housing.....	do.....	
Circuit-breaker housing cap. ^a	1	do....	In housing.....	do.....	
Circuit-breaker contact pin. ^a	1	Steel....	Actuates pin.....	do.....	
Circuit-breaker contact-pin spring. ^a	1	Vulcanized fiber.	Surrounds pin.....	do.....	
Circuit-breaker contact-pin insulation. ^a	1	Bronze.	Screws on pin.....	do.....	
Circuit-breaker contact clamp nut. ^a	1	Asbestos and tallow in canvas.	On obturator spindle.	do.....	Pad, gas-check.
Gas-check pad.....	1	Steel....	Between gas-check pad and obturator-spindle head.	do.....	Front exterior split ring.
Front split ring....	1	do....	Between gas-check pad and filling-in disk.	do.....	Rear exterior split ring.
Rear split ring....	1	do....	Between gas-check pad and breech-block.	do.....	Rear interior split ring, spindle ring.
Small split ring....	1	do....	Between gas-check pad and breech-block.	do.....	Disk.
Filling-in disk....	1	do....	Between gas-check pad and breech-block.	do.....	Dust guard.
Dust cover.....	1	do....	Between gas-check pad and breech-block.	do.....	Dust-guard screws.
Dust-cover screws.	8	do....	Between gas-check pad and breech-block.	do.....	Antifriction washers.
Obturator spindle washers.	2	Bronze.	Between obturator spindle and breech-block.	Interchangeable, except rear one, steel, which has a flat face.	
Tray, complete:					
Hinge pin, complete—					
Hinge pin.....	1	Steel....	Holds tray to hinge.	Hinge pin and hinge-pin nut not issued separately.	
Hinge-pin nut....	1	do....	On hinge pin.	Interchangeable.	
Hinge-pin nut pin.	1	do....	In hinge-pin nut.	do.....	
Hinge-pin washer.	1	do....	On hinge pin.	do.....	
Translating roller.	1	do....	In tray.	do.....	Roller.
Translating crank.	1	do....	On translating roller.	do.....	Roller crank.
Translating-crank nut.	1	do....	On translating roller.	To be issued with translating roller.	Roller-crank nut.
Translating-crank nut pin.	1	do....	In translating-crank nut.	Interchangeable.	Roller-crank nut pin.
Tray-latch body....	1	do....	In tray.	do.....	
Tray-latch handle, male.	1	do....	In tray-latch body.	Interchangeable. Should be issued together.	
Tray-latch handle, female.	1	do....	do.....	do.....	
Tray-latch handle pin.	1	do....	do.....	Interchangeable.	
Tray-latch pivot....	1	do....	Holds tray latch to tray.	do.....	Tray-latch bolt.
Tray-latch pivot washer.	1	do....	In tray-latch pivot.	do.....	Tray-latch bolt washer.
Tray-latch pivot pin.	1	do....	do.....	do.....	Tray-latch bolt pin.
Tray-spring bolt....	1	do....	In tray.	do.....	Tray-spring lock, spring lock for tray latch.
Tray-spring bolt spring.	1	do....	On tray-spring bolt.	do.....	Do.
Tray-spring bolt shoe.	1	do....	Screwed to tray-spring bolt.	do.....	
Tray-spring bolt shoe screw.	1	do....	Holds shoe to spring bolt.	do.....	
Tray.....	1	Bronze.	Attached to breech.	do.....	Console.

^a On breech of gun.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray—Continued.					
Tray plate.....	1	Bronze..	On front face of tray..	Interchangeable....	Tray bushing, tray cap.
Tray-plate screws...	2	Steel.....	.....	.....	Tray-bushing screws, tray-cap screws.
Tray back-latch catch.	1	...do....	Screwed to tray.....	Interchangeable....	Securing latch catch.
Tray back-latch catch nut.	1	...do....	On tray back-latch catch.	.....do.....	Securing latch-catch nut.
Tray back-latch catch screw.	1	...do....	Screws tray back-latch catch to tray.	.....do.....	Securing latch-catch screw.

Parts attached to mortar proper, but removable.

Hinge.....	1	Steel.....	Screwed to breech.....		Hinge block.
Hinge screws, 2 long, 1 short.	3	...do....	Screw hinge to breech	Interchangeable....	Hinge-block screws.
Rotating segment.....	1	...do....	Screwed to breech....	Can be fitted only at factory. Some mortars of this model have the segment solid with mortar.	
Rotating-segment screws.	3	...do....	Hold rotating segment to breech.	Interchangeable. Not used when segment is solid with mortar.	Rotating-rack screws.
Face-plate stop bolt...	2	...do....	Screwed into face of breech.	Used in mortars having segment solid.	
Tray back latch: Tray back-latch body.	1	...do....	Attached to breech...	Interchangeable....	Securing latch body, securing latch
Tray back-latch handle.	1	...do....	Attached to tray back-latch body.	.....do.....	Securing latch handle, securing latch.
Tray back-latch handle pin.	1	...do....	In tray back-latch handle.	.....do.....	Securing latch-handle pin, securing latch.
Tray back-latch bolt..	1	...do....	Holds tray back latch to breech.	.....do.....	Securing latch-bolt.

12-INCH B. L. MORTAR, MODEL 1890.

(Only eight of this model were manufactured.)

Weight, 13 gross tons (29,120 pounds).
Distance between rimbases, 40 inches.
Length of trunnions, 8 inches.
Distance of axis of trunnions from muzzle, 90.125 inches.
Total length, 141.125 inches.
Length of bore, 119.75 inches.
Maximum diameter of breech, 38 inches.
Diameter of muzzle, 21 inches.
Diameter of trunnions, 12 inches.
Powder chamber:
Diameter, 12.5 inches.
Length, 20.83 inches.
Capacity, 2,665.1 cubic inches.

Travel of projectile in bore, — caliber, 98.92 inches.

Projectile:

Kind.	Deck-piercing shell.		Torpedo shell.		Cast-iron shell.	
Weight (filled).....pounds..	800	1,000	800	1,000	800	1,000
Ratio of weight to weight of piece.....	1-40	1-30	1-40	1-30	1-40	1-30
Weight of bursting charge, gun cotton.....pounds..	22.1	39.4	67.7	84.6	12.5	19.6
Length.....calibers..	8.0	4.0	4.0	5.0	3.0	3.5
Sectional density $\frac{W}{V}$	7.08	8.94	7.08	8.94	7.08	8.94
Price each (without bursting charge or fuse).....	\$40	\$90	\$—	\$70	\$29	\$35.90

^a Rifle powder.

Powder:

Kind, brown prismatic and smokeless, 12-inch mortar^a or siege gun and howitzer.

Weight, ^b 105 ^c pounds brown; ^b 50 ^c pounds smokeless.

Density of loading, 1.0861 ^c brown; 0.5172 ^c smokeless.

Muzzle velocity:

Brown, ^b 1,020 ^c feet per second.

Smokeless, ^b 1,150 ^c feet per second.

Maximum pressure per square inch:

Brown, ^b 31,000 ^c pounds.

Smokeless, ^b 33,000 ^c pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, ^b 9.7 ^c inches.

Smokeless, ^b 11.5 ^c inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, ^b 9.3 ^c inches.

Smokeless, ^b 10.7 ^c inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, ^b 8.7 ^c inches.

Smokeless, ^b 9.9 ^c inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, ^b 8.4 ^c inches.

Smokeless, ^b 9.4 ^c inches.

Muzzle energy:

Brown, ^b 7,212 ^c foot-tons.

Smokeless, ^b 9,168 ^c foot-tons.

Rifling:

Number of grooves, 72.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.08 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 40 calibers at origin, increasing to one turn in 20 calibers at 17.1 inches from muzzle, being uniform over the 17.1 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

^a Kind of powder varies with the range.

^b For 1,000-pound shell; with the 800-pound shell the velocities are 1,150 and 1,325 feet per second with brown and smokeless powder, respectively.

^c Maximum: The weight of charge varies with the range; for issues in bulk, the average charge is assumed to be three-fourths the maximum.

12-INCH B. L. MORTAR, MODEL 1886-1890 M₁

(Price of mortar, \$10,249.00.)

INCLUDES MORTAR PROPER, BREECH MECHANISM, AND ATTACHED PARTS, AS PER LIST BELOW.

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock.....	1	Steel....	In breech.....	Interchangeable....	Block.
Breechblock oil-hole screw.....	1	do.....	In breechblock.....	All mortars do not have this screw; are to be put on later.	
Face plate.....	1	do.....	Screwed to breechblock.	Removable only at gun factory.	"Banjo."
Face-plate screws, 2 long, 3 short.....	5	do.....	Hold face plate to breechblock.	Interchangeable....	Face-plate bolts.
Block handle.....	1	do.....	Riveted to face plate	do.....	Face-plate handle.
Block-handle nuts.....	2	Bronze.....		Used with bronze handles.	Face-plate nuts.
Translating stud.....	1	do.....	Dovetailed into face plate.	Interchangeable....	
Vent cover—					
Vent cover proper.....	1	do.....	Covers vent.....	Can be fitted only at factory.	Vent cover, lower part.
Vent-cover bar.....	1	do.....	In face plate.....	do.....	Vent cover, upper part.
Vent-cover screw.....	1	do.....	Holds vent-cover bar to vent cover proper.	do.....	
Rotating crank.....	1	do.....	Attached to rotating-crank gear axle.	Interchangeable....	
Rotating-crank bushing.....	1	Bronze.....	In face plate.....	Interchangeable. These can not be inserted at forts.	
Rotating-crank nut.....	1	Steel....	On rotating-crank gear axle.	Interchangeable....	
Rotating-crank nut pin.....	1	do.....	In rotating-crank nut.	do.....	
Rotating-crank gear.....	1	Bronze.....	On rotating-crank gear axle.	do.....	Lower gear.
Rotating-crank gear axle.....	1	Steel....	In face plate.....	do.....	Lower-gear axle.
Rotating-crank gear nut.....	1	Bronze.....	On inner end of rotating-crank gear axle.	do.....	
Rotating-crank gear key.....	1	Steel....	Fastens rotating-crank gear to axle.	do.....	
Rotating gear.....	1	do.....	Works in rotating segment.	do.....	Upper gear.
Rotating-gear key.....	1	do.....	Fastens rotating gear to rotating pinion.	do.....	
Rotating pinion.....	1	do.....	In upper end of face plate.	do.....	Upper pinion.
Rotating-pinion nut.....	1	do.....	On rotating pinion.....	do.....	
Rotating - pinion bushing, inner.....	1	Bronze.....	In front face of face plate.	Interchangeable. Can not be inserted at forts.	
Rotating - pinion bushing, outer.....	1	do.....	In rear face of face plate.	do.....	
Rotating-pinion nut pin.....	1	Steel....	In rotating-pinion nut	Interchangeable....	
Rotating-crank lock housing.....	1	do.....	Screwed into face plate.	do.....	
Rotating-crank lock front stud.....	1	do.....	In face plate.....	do.....	
Rotating-crank lock rear stud.....	1	do.....	In rotating crank.....	do.....	
Rotating-crank lock spring.....	1	do.....	do.....	do.....	
Rotating-crank lock handle.....	1	do.....	On rotating-crank lock rear stud.	do.....	Wing nut.
Rotating-crank lock handle pin.....	1	do.....	In rotating-crank lock handle.	do.....	Wing-nut pin.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator, complete: Obturator spindle, complete— Obturator spindle.	1	Steel....	In breechblock	Interchangeable	Spindle, mushroom; also wrongly called obturator.
Obturator nut.....	1	do.....	On obturator spindle.....	do.....	Obturator-spindle nut.
Obturator lock nut.	1	do.....	On obturator spindle, rear of obturator nut.	do.....	Lock nut.
Pressure-plug screws.	2	Bronze.	In face of obturator-spindle head	do.....	
Pressure-plug washers.	2	do.....	On pressure-plug screw	do.....	
Vent bushing, rear.	1	Copper.	Screwed into rear end of obturator spindle.	do.....	Vent piece.
Vent bushing, front.	1	do.....	Pressed into face of obturator spindle.	do.....	Do.
Firing attachment, complete— Slide housing.....	1	Steel....	On end of spindle	do.....	Housing.
Locking pins.....	2	do.....	In housing	do.....	Securing pins.
Locking-pin forks.	2	do.....	On top of pins	do.....	
Locking-pin fork pins.	2	do.....	Secure fork to pin	do.....	
Guide pin	1	do.....	On right of housing	do.....	
Ejector	1	do.....	Seated in housing	do.....	
Slide	1	do.....	In rear of housing	do.....	
Slide handle.....	1	do.....	Part of slide	do.....	
Slide-spring stop.	1	do.....	In groove left side of housing.	Interchangeable	Slide catch.
Contact piece.....	1	do.....	Screwed to slide.....	do.....	
Contact-piece screws.	2	do.....	Secure contact piece to slide.	do.....	
Contact-piece insulation.	1	Vulcanized fiber.		do.....	
Contact springs....	2	Brass....	Riveted to contact piece.	do.....	
Contact binding screw.	1	do.....	Contact piece.....	do.....	
Contact binding-screw pin.	1	Steel....	Secures screw against coming out.	do.....	
Firing leaf.....	1	do.....	Pivoted to slide	do.....	Leaf.
Firing-leaf pivot.	1	do.....		do.....	Leaf pin.
Firing-leaf springs.	2	do.....	On pivot.....	do.....	
Safety bars.....	1	do.....	On safety-bar arm.....	do.....	Vent shield.
Safety-bar arm	1	do.....	Seated on block	do.....	Vent shield body.
Safety-bar screws.	1	do.....	In safety bar	do.....	
Circuit-breaker, complete— Circuit-breaker housing. ^b	1	Bronze.	On face plate.....	Interchangeable	
Circuit-breaker housing screws. ^b	4	Steel....	Secure housing to face plate.	do.....	
Circuit-breaker housing cap. ^b	1	Bronze.	On housing	do.....	
Circuit-breaker housing contact pin. ^b	1	do.....	In housing	do.....	
Circuit-breaker housing contact pin insulation. ^b	1	Vulcanized fiber.	Surrounds pin.....	do.....	
Circuit-breaker housing clamp nut. ^b	1	Bronze.	Screws on pin	do.....	
Circuit-breaker housing. ^c	1	do.....	On breech of gun.....	do.....	
Circuit-breaker housing screws. ^c	2	Steel....	Secure housing to gun.	do.....	
Circuit-breaker housing cap. ^c	1	Bronze.	On housing	do.....	

^a Replaces vent shield.^b On face plate.^c On breech of gun.

NOTE.—This firing mechanism is to be replaced by a new one. List of parts will be furnished for insertion when completed.

Breach mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Cont'd.					
Obturator spindle, complete—Contd.					
Circuit-breaker contact pin. ^a	1	Bronze.	In housing	Interchangeable ...	
Circuit-breaker contact-pin spring. ^a	1	Steel....	Actuates pin.....	do	
Circuit-breaker contact-pin insulation. ^a	1	Vulcanized fiber.	Surrounds pin	do	
Circuit-breaker contact clamp nut. ^a	1	Bronze	Screws on pin	do	
Gas-check pad....	1	Asbestos and tal- low in canvas.	On obturator spindle.	do	Pad, gas check.
Front split ring....	1	Steel....	Between gas-check pad and obturator-spindle head.	do	Front exterior split ring.
Rear split ring....	1	do	Between gas-check pad and filling-in disk.	do	Rear exterior split ring.
Small split ring....	1	do	do	do	Rear interior split ring, spin- die ring.
Filling-in disk....	1	do	Between gas-check pad and breech- block.	do	Disk.
Dust cover.....	1	do	do	do	Dust guard.
Dust-cover screws.	3	do	do	do	Dust-guard screws.
Obturator spindle washer.	2	Bronze	Between obturator spindle and breech- block.	Interchangeable, ex- cept rear one, steel, which has a flat face.	
Tray, complete:					
Hinge pin, com- plete—					
Hinge pin	1	Steel....	Holds tray to hinge ..	Hinge pin and hinge- pin nut not issued separately. Inter- changeable.	
Hinge-pin nut....	1	do	On hinge pin	Interchangeable	
Hinge-pin nut pin.	1	do	In hinge-pin nut	do	
Hinge-pin washer.	1	do	On hinge pin	do	
Translating roller.	1	do	In tray	do	Roller.
Translating crank.	1	do	On translating roller.	do	Roller crank.
Translating-crank nut.	1	do	do	To be issued with translating roller.	Roller-crank nut
Translating-crank nut pin.	1	do	In translating-crank nut.	Interchangeable	
Tray-latch body....	1	do	In tray	do	
Tray-latch handle, male.	1	do	In tray-latch body ..	Interchangeable. Should be issued together.	
Tray-latch handle, female.	1	do	do	do	
Tray-latch handle pin.	1	do	In tray-latch handle ..	Interchangeable	
Tray-latch pivot....	1	do	Holds tray latch to tray.	do	Tray-latch bolt.
Tray-latch pivot washer.	1	do	In tray-latch pivot ..	do	Tray-latch bolt washer.
Tray-latch pivot pin.	1	do	do	do	Tray-latch bolt pin.
Tray-latch catch	1	do	Screwed to breech....	In some mortars the catch is solid with the breech. Inter- changeable.	
Tray-latch catch screw.	1	do	Holds tray-latch catch to breech.	Interchangeable	
Tray-spring bolt....	1	do	In tray	do	Tray-spring lock.
Tray-spring bolt spring.	1	do	On tray-spring bolt ..	do	
Tray-spring bolt shoe.	1	do	do	do	
Tray-spring bolt-shoe screw.	1	do	do	do	
Tray.....	1	Bronze	Attached to breech....	do	Console.
Tray plate.....	1	do	do	do	Tray bushing tray cap.

^a On breech of gun.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray—Continued.					
Tray-plate screws...	2	Steel.....	.....	.....	Tray-bushing, screws, tray-cap screws.
Tray back-latch catch.	1	...do....	Screwed to tray.....	Interchangeable	Securing-latch catch.
Tray back-latch catch nut.	1	...do....	On tray back-latch catch.	.....do.....	Securing-latch catch nut.
Tray back-latch catch screw.	1	...do....	Screws tray back-latch catch to tray.	.....do.....	Securing-latch catch screw.

Parts attached to mortar proper, but removable.

Hinge	1	Steel.....	Screwed to breech....	.....	Hinge block.
Hinge screws, 2 long, 1 short.	3	...do....	Screw hinge to breech	Interchangeable	Hinge-block screws.
Rotating segment.....	1	...do....	Screwed to breech ...	Can be fitted only at factory	Rotating rack.
Rotating-segment screws.	3	...do....	Holds rotating segment to breech.	Interchangeable	Rotating-rack screws.
Tray back latch: Tray back-latch body	1	...do....	Attached to breech...	.....do.....	Securing-latch body, securing latch.
Tray back-latch handle.	1	...do....	Attached to tray-back latch body.	.....do.....	Securing-latch handle, securing latch.
Tray back-latch handle pin.	1	...do....	In tray back-latch handle.	.....do.....	Securing-latch handle pin, securing latch.
Tray back-latch bolt..	1	...do....	Holds tray back-latch to breech.	.....do.....	Securing-latch bolt.

12-INCH B. L. MORTAR, MODEL 1886-90 M1.

(There are but eight of these mortars in service; they resemble the Model 1886 mortars, and were built to complete a battery of sixteen mortars at Fort Capron, Sullivan's Island S. C. This battery contains eight Model 1886 mortars and eight Model 1896-90 M1 mortars.)

Weight, 12 gross tons (26,885 pounds).

Distance between rimbases, 40 inches.

Length of trunnions, 8 inches.

Distance of axis of trunnions from muzzle, 81.4 inches.

Total length, 129.25 inches.

Length of bore, 108.335 inches.

Maximum diameter of breech, 38 inches.

Diameter of muzzle, 21 inches.

Diameter of trunnions, 12 inches.

Powder chamber:

Diameter, 12.4 inches.

Length, 16.05 inches.

Capacity, 2.021 cubic inches.

Travel of projectile in bore, — calibers, 91.875 inches.
Projectile:

Kind.	Deck-piercing shell.	Torpedo shell.	Cast-iron shell.
Weight (filled)..... pounds..	800 1,000	800 1,000	800 1,000
Ratio of weight to weight of piece.....	1-40 1-30	1-40 1-30	1-40 1-30
Weight of bursting charge, gun cotton..... pounds..	22.1 39.4	67.7 84.6	12.5 19.6
Length..... calibers..	3.0 4.0	4.0 5.0	3.0 3.5
Sectional density, $\frac{W}{L^2}$	7.08 8.94	7.08 8.94	7.08 8.94
Price of each (without bursting charge or fuse)...	\$80 \$90	\$— \$70	\$29 \$35.90

^a Rifle powder.

Powder:

Kind, brown prismatic and smokeless, 12-inch mortar ^a or siege gun and howitzer.

Weight, ^b 105 ^c pounds brown; ^b 50 ^c pounds smokeless.

Density of loading, 1.0861 ^c brown; 0.5172 ^c smokeless.

Muzzle velocity:

Brown, ^b 1,020 ^c feet per second.

Smokeless, ^b 1,150 ^c feet per second.

Maximum pressure per square inch:

Brown, ^b 31,000 ^c pounds.

Smokeless, ^b 33,000 ^c pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, ^b 9.7 ^c inches.

Smokeless, ^b 11.5 ^c inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, ^b 9.3 ^c inches.

Smokeless, ^b 10.7 ^c inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, ^b 8.7 ^c inches.

Smokeless, ^b 9.9 ^c inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, ^b 8.4 ^c inches.

Smokeless, ^b 9.4 ^c inches.

Muzzle energy:

Brown, ^b 7,212 ^c foot-tons.

Smokeless, ^b 9,168 ^c foot-tons.

Rifling:

Number of grooves, 72.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.07 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 40 calibers at origin, increasing to one turn in 25 calibers at 16.525 inches from muzzle, being uniform over the 16.525 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

^a Kind of powder varies with the range.

^b For 1,000-pound shell; with the 800-pound shell the velocities are 1,150 and 1,325 feet per second with brown and smokeless powder, respectively.

^c Maximum: The weight of charge varies with the range; for issues in bulk the average charge is assumed to be three-fourths the maximum.

12-INCH B. L. MORTAR, MODEL 1890 M.

(Price of mortar, \$10,249.)

INCLUDES MORTAR PROPER, BREECH MECHANISM, AND ATTACHED PARTS, AS PER LIST BELOW.

Breech mechanism.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock.....	1	Steel....	In breech.....	Interchangeable	Block.
Breechblock oil-hole screw.	1	...do	In breechblock.....	All mortars do not have this screw; are to be put on later.	
Face plate.....	1	...do	Screwed to breechblock.	Removable only at factory.	"Banjo."
Face-plate screws, 2 long, 3 short.	5	...do	Hold face plate to breechblock.	Interchangeable	Face-plate bolts.
Block handle.....	1	Bronze .	Riveted to face plate.	...do	Face-plate handle.
Block-handle nuts...	2	Steel....	.....	Used with bronze handle.	Face-plate nuts.
Translating stud	1	...do	Dovetailed into face plate.	Interchangeable	
Vent cover—					
Vent cover proper.	1	...do	Covers vent.....	Can be fitted only at factory.	Vent cover, lower part.
Vent-cover bar	1	...do	In face plate.....	...do	Vent cover, upper part.
Vent-cover screw..	1	...do	Holds vent-cover bar to vent cover proper.	...do	
Rotating crank.....	1	...do	On rotating-crank gear axle.	Interchangeable	
Rotating-crank bushing.	1	Bronze .	In face plate.....	Interchangeable. These can not be inserted at forts.	
Rotating-crank nut...	1	Steel....	On rotating-crank gear axle.	Interchangeable	
Rotating-crank nut pin.	1	...do	In rotating-crank nut.	...do	
Rotating-crank gear.	1	Bronze .	On rotating-crank gear axle.	...do	Lower gear.
Rotating-crank gear axle.	1	Steel....	In face plate.....	...do	Lower-gear axle.
Rotating-crank gear nut.	1	Bronze .	On inner end of rotating crank gear axle.	...do	
Rotating-crank gear key.	1	Steel....	Fastens rotating-crank gear axle.	...do	
Rotating gear	1	...do	Works in rotating segment.	...do	Upper gear.
Rotating-gear key...	1	...do	Fastens rotating gear to rotating pinion.	...do	
Rotating pinion	1	...do	In upper end of face plate.	...do	Upper pinion.
Rotating-pinion nut.	1	...do	On rotating pinion...	...do	
Rotating-pinion bushing, inner	1	Bronze .	In front face of face plate.	Interchangeable. Can not be inserted at forts.	
Rotating-pinion bushing, outer.	1	...do	In rear face of face plate.	...do	
Rotating-pinion nut pin	1	Steel....	In rotating-pinion nut.	Interchangeable	
Rotating crank lock housing	1	...do	Screwed into face plate.	...do	
Rotating-crank lock front stud.	1	...do	In face plate.....	...do	
Rotating crank lock spring.	1	...do	In rotating crank .....	...do	
Rotating-crank lock rear stud.	1	...do ....	...do .....	...do	
Rotating crank lock handle	1	...do	On rotating-crank lock rear stud.	...do	Wing nut.
Rotating-crank lock handle pin.	1	...do	In rotating-crank lock handle.	...do	Wing-nut pin.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator, complete: Obturator spindle, complete— Obturator spindle.	1	Steel....	In breechblock.....	Interchangeable....	Spindle, mushroom; also wrongly called obturator.
Obturator nut.....	1	...do....	On obturator spindle.	...do....	Obturator spindle nut.
Obturator locking nut.	1	...do....	On obturator spindle in rear of obturator nut.	...do....	Lock nut.
Pressure-plug screws.	2	Bronze.	In face of obturator-spindle head.	...do....	
Pressure-plug washers.	2	...do....	On pressure-plug screws.	...do....	
Vent bushing, front.	1	Copper.	Forced into front end of obturator spindle.	...do....	Vent piece.
Vent bushing, rear.	1	...do....	Screwed into rear end of obturator spindle.	...do....	
Firing attachment, complete—					
Slide housing.....	1	Steel....	On end of spindle....	do	Housing.
Locking pins.....	2	...do....	In housing.....	do	Securing pins.
Locking-pin forks.	2	...do....	On top of pins.....	do	
Locking-pin fork pins.	2	...do....	Secure fork to pin....	do	
Guide pin.....	1	...do....	On right of housing....	do	
Ejector.....	1	...do....	Seated in housing....	do	
Slide.....	1	...do....	In rear of housing....	do	
Slide handle.....	1	...do....	Part of slide.....	do	
Slide-spring stop...	1	...do....	In groove left side of housing.	Interchangeable....	Slide catch.
Contact piece.....	1	...do....	Screwed to slide....	do	
Contact-piece screws.	2	...do....	Secure contact piece to slide.	do	
Contact-piece insulation.	1	Vulcanized fiber.		do	
Contact springs....	2	Brass....	Riveted to contact piece.	do	
Contact binding screw.	1	...do....	Contact piece.....	do	
Contact binding-screw pin.	1	Steel....	Secures screw against coming out.	do	
Firing leaf.....	1	...do....	Pivoted to slide....	do	Leaf.
Firing-leaf pivot.	1	...do....		do	Leaf pin.
Firing-leaf springs.	2	...do....	On pivot.....	do	
Safety bar ^a	1	...do....	On safety-bar arm.	do	Vent shield.
Safety-bar arm....	1	...do....	Seated on block....	do	Vent shield body.
Safety-bar screws..	1	...do....	In safety bar.....	do	
Circuit-breaker, complete—					
Circuit-breaker housing. ^b	1	Bronze.	On face plate.....	Interchangeable....	
Circuit-breaker housing screws. ^b	4	Steel....	Secure housing to face plate.	do	
Circuit-breaker housing cap. ^b	1	Bronze.	On housing.....	do	
Circuit-breaker housing contact pin. ^b	1	...do....	In housing.....	do	
Circuit-breaker housing contact pin insulation. ^b	1	Vulcanized fiber.	Surrounds pin.....	do	
Circuit-breaker housing clamp nut. ^b	1	Bronze.	Screws on pin.....	do	
Circuit-breaker housing. ^c	1	...do....	On breech of gun....	do	
Circuit-breaker housing screws. ^c	2	Steel....	Secure housing to gun.	do	
Circuit-breaker housing cap. ^c	1	Bronze.	On housing.....	do	

^a Replaces vent shield^b On face plate.^c On breech of gun.

NOTE.—This firing mechanism is to be replaced by a new one. List of parts will be furnished for insertion when completed

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Cont'd.					
Circuit-breaker, complete—Cont'd.					
Circuit-breaker contact pin. ^a	1	Bronze.	In housing	Interchangeable	
Circuit-breaker contact-pin spring. ^a	1	Steel ...	Actuates pin	do	
Circuit-breaker contact-pin insulation. ^a	1	Vulcanized fiber.	Surrounds pin.....	do	
Circuit-breaker contact clamp nut. ^a	1	Bronze.	Screws on pin	do	
Gas-check pad.....	1	Asbestos and tal-low in canvas.	On obturator spindle	do	Gas-check pad.
Front split ring....	1	Steel....	Between gas-check pad and obturator-spindle head.	do	Front exterior split ring.
Rear split ring.....	1	do	Between gas-check pad and filling-in disk.	do	Rear exterior split ring.
Small split ring....	1	do	do	do	Rear exterior split ring; spindle ring.
Filling-in disk.....	1	do	Between gas-check pad and breech-block.	do	Disk.
Dust cover.....	1	do	do	do	Dust guard.
Dust-cover screws.	8	do	do	do	Dust-guard screws.
Obturator-spindle washers.	2 2	Bronze. Steel....	Between obturator spindle and breech-block.	Interchangeable, except rear steel one, which has a flat face.	Antifriction washers.
Tray, complete:					
Hinge pin, complete—					
Hinge pin	1	Steel....	Holds tray to hinge ..	Hinge pin and hinge-pin nut not issued separately. Interchangeable.	
Hinge-pin nut.....	1	do	On hinge pin	Interchangeable	
Hinge-pin nut pin.	1	do	In hinge-pin nut	do	
Hinge-pin washer.	1	do	On hinge pin	do	
Translating roller.	1	do	In tray	do	Roller.
Translating crank...	1	do	On translating roller.	do	Roller crank.
Translating-crank nut.	1	do	do	To be issued with translating roller.	Roller-crank nut.
Translating-crank nut pin.	1	do	On translating-crank nut.	Interchangeable	Roller-crank nut pin.
Tray-latch body.....	1	do	In tray	do	
Tray-latch handle, male.	1	do	In tray-latch body....	Interchangeable. Should be issued together.	
Tray-latch handle, female.	1	do	do	do	
Tray-latch handle pin.	1	do	In tray-latch handle..	Interchangeable	
Tray-latch pivot.....	1	do	Holds tray latch to tray.	do	Tray-latch bolt.
Tray-latch pivot washer.	1	do	In tray-latch pivot ..	do	Tray-latch bolt washer.
Tray-latch pivot pin.	1	do	do	do	Tray-latch bolt pin.
Tray-spring bolt.....	3	do	In tray	do	Tray-spring lock.
Tray-spring bolt spring.	1	do	On tray-spring bolt..	do	
Tray-spring bolt shoe.	1	do	do	do	
Tray-spring bolt-shoe screw.	1	do	do	do	
Tray.....	1	Bronze..	Attached to breech..	do	Console.
Tray plate.....	1	do	do	do	Tray bushing, tray cap.
Tray-plate screws. ..	2	Steel....	do	do	Tray-bushing screws, tray-cap screws.

^a On breech of gun.

Breech mechanism—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Tray—Continued.					
Tray back-latch catch.	1	Steel....	Screwed to tray	Interchangeable	Securing-latch catch.
Tray back-latch catch nut.	1	...do....	On tray back-latch catch.	.....do.....	Securing-latch catch nut.
Tray back-latch catch screw.	1	...do....	Screws tray back-latch catch to tray.	.....do.....	Securing-latch catch screw.

Parts attached to mortar proper, but removable.

Hinge	1	Steel....	Screwed to breech....	.....do.....	Hinge block.
Hinge screws, 2 long, 1 short.	3	...do....	Screw hinge to breech.	Interchangeable	Hinge-block screws.
Rotating segment	1	...do....	Screwed to breech....	Can be fitted only at factory. In some mortars is solid with the gun.	Rotating rack.
Rotating-segment screws.	3	...do....	Hold rotating segment to breech.	Interchangeable....	Rotating-rack screws.
Tray back latch: Tray back-latch body	1	...do....	Attached to breech....	.....do.....	Securing-latch body, securing latch.
Tray back-latch handle.	1	...do....	Attached to tray back-latch body.	.....do.....	Securing-latch handle, securing latch.
Tray back-latch handle pin.	1	...do....	In tray back-latch handle.	.....do.....	Securing-latch handle pin, securing latch.
Tray back-latch bolt ..	1	...do....	Hold tray back-latch to breech.	.....do.....	Securing-latch bolt.
Face-plate stops	2	...do....	Screwed into breech....	.....do.....	

12-INCH B. L. MORTAR, MODEL 1890 M1.

Weight, 13 gross tons (29,120 pounds).

Distance between rimbases, 40 inches.

Length of trunnions, 8 inches.

Distance of axis of trunnions from muzzle, 89.6 inches.

Total length, 141.125 inches.

Length of bore, 120.05 inches.

Maximum diameter of breech, 38 inches.

Diameter of muzzle, 21 inches.

Diameter of trunnions, 12 inches.

Powder chamber:

Diameter, 12.5 inches.

Length, 21.13 inches.

Capacity, 2,676 cubic inches.

Travel of projectile in bore, — calibers, 98.92 inches.

Projectile:

Kind.	Deck-piercing shell.		Torpedo shell.		Cast-iron shell.	
Weight (filled).....pounds..	800	1,000	800	1,000	800	1,000
Ratio of weight to weight of piece.....	1-40	1-30	1-40	1-30	1-40	1-30
Weight of bursting charge, gun cotton...pounds..	22.1	33.4	67.7	84.6	12.5	19.6
Length.....calibers..	3.0	4.0	4.0	5.0	3.0	3.5
Sectional density $\frac{W}{L^3}$	7.08	8.94	7.08	8.94	7.08	8.94
Price of each (without bursting charge or fuse)...	\$30	\$30	\$70	\$70	\$23	\$35.90

a Rifle powder.

Powder:

Kind, brown prismatic and smokeless, 12-inch mortar ^a or siege gun and howitzer.

Weight, ^b 105 c pounds brown; ^b 50 c pounds smokeless.

Density of loading, 1.0881 c brown; 0.5172 c smokeless.

Muzzle velocity:

Brown, ^b 1,020 c feet per second.

Smokeless, ^b 1,150 c feet per second.

Maximum pressure per square inch:

Brown, ^b 31,000 c pounds.

Smokeless, ^b 33,000 c pounds.

Penetration in steel (De Marre formula, normal impact) at muzzle:

Brown, ^b 9.7 c inches.

Smokeless, ^b 11.5 c inches.

Penetration in steel (De Marre formula, normal impact) at 1,000 yards:

Brown, ^b 9.3 c inches.

Smokeless, ^b 10.7 c inches.

Penetration in steel (De Marre formula, normal impact) at 2,500 yards:

Brown, ^b 8.7 c inches.

Smokeless, ^b 9.9 c inches.

Penetration in steel (De Marre formula, normal impact) at 3,500 yards:

Brown, ^b 8.4 c inches.

Smokeless, ^b 9.4 c inches.

Muzzle energy:

Brown, ^b 7,212 c foot-tons.

Smokeless, ^b 9,168 c foot-tons.

Rifling:

Number of grooves, 72.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling one turn in 40 calibers at origin, increasing to one turn in 20 calibers at 17.55 inches from muzzle, being uniform over the 17.55 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

GUNNER'S QUADRANTS.

One gunner's quadrant is furnished with each mortar. (For description of quadrant, see Handbook of Sights for Cannon, 1899.)

Screw studs, for quadrant seats, have been provided for all 12-inch B. L. mortars in the service or yet to be supplied to posts to complete the contemplated armament.

FUSES.

The fuses used with projectiles for 12-inch breech-loading mortars are:

For shell detonating—

Low resistance base fuse, "A."

Low resistance base fuse, "W." "

^a Kind of powder varies with the range.

^b For 1,000-pound shell; with the 300-pound shell the velocities are 1,150 and 1,325 feet per second with brown and smokeless powder, respectively.

^c Maximum: The weight of charge varies with the range; for issues in bulk, the average charge is assumed to be three-fourths the maximum.

PRIMERS.

Obturator, electric (screwed), double wire, model 1899, F. A.

Obturator, electric (screwed), single wire, model 1900, F. A.

Obturator, electric (new model), 1899, F. A.

Combination electric and friction, model 1900, F. A.

CLEANING MATERIAL.

For annual allowance of material for cleaning, preservation, etc., see Supply Table, page 359 and 360.

SPARE PARTS FOR MORTAR.

The following spare parts are issued for 12-inch breech-loading mortars, either model:

		Price, each.	
		Model 1896.	Model 1899 and Jan. 1.
Vent cover.....	1 per post.....	\$10.00	\$10.40
Rotating-crank lock front stud.....	1 for 4 mortars.....	2.60	2.00
Rotating-crank lock spring.....	1 per mortar.....	.65	.65
Rotating-crank lock rear stud.....	1 for 4 mortars.....	3.25	3.25
Rotating-crank lock handle.....	1 for 4 mortars.....	3.25	3.25
Rotating-crank lock-handle pin.....	1 for 4 mortars.....	.32	.32
Front split ring.....	1 per post.....	14.80	14.80
Rear split ring.....	1 per post.....	14.80	14.80
Small split ring.....	1 per post.....	7.00	7.00
Gas-check pad.....	1 for 8 mortars.....	7.80	7.80
Translating roller.....	1 for 8 mortars.....	19.60	19.60
Tray latch.....	1 for 8 mortars.....	36.00	36.00
Tray-spring bolt.....	1 for 4 mortars.....	5.20	5.20
Tray-spring bolt spring.....	1 per mortar.....	1.30	1.30
Tray-spring bolt shoe.....	1 for 4 mortars.....	2.50	2.50
Tray-spring bolt-shoe screw.....	1 for 4 mortars.....	.50	.50
Tray back latch.....	1 for 8 mortars.....	16.00	16.00
Firing attachment, complete.....	1 for 8 mortars.....	112.00	112.00
Hinge-pin oil-hole screws.....	1 for each mortar.....	.82	.82

NOTE.—A set of spare parts as enumerated above should always be kept on hand at post.

In ordering spare parts always give the name of maker, model, and number of gun for which parts are required.

See note, page 43, relative to spare parts.

SUBCALIBER TUBES.

(Price of tube fixtures complete, \$296.)

18 pounder (2.96" caliber) subcaliber tubes are issued for use with 12-inch breech-loading mortars, one for each pit of four mortars to each post having guns of this caliber mounted. The list of parts of tube and fixtures is as follows:

List of parts of subcaliber tubes and fixtures (for mortar model 1896).

- 1 gun body.
- 1 rear adapter.
- 1 front adapter.
- 1 clamp wedge screw.
- 1 adapter clamp wedge.
- 1 adapter check plate.
- 1 thread clamp screw.
- 1 obturator spindle plate.
- 1 securing screw.

Accessories and spare parts for subcaliber tubes.

The following accessories and spare parts are furnished with each subcaliber tube for 12-inch breech-loading mortar:

ACCESSORIES.

- 1 gun extractor.
- 1 securing screw wrench.
- 1 adjusting wrench.
- 1 clamping wrench.
- 1 handspike head.
- 1 bristle sponge and rod, complete
 - 1 sponge rod.
 - 1 sponge body.
 - 1 male sponge rod connection.
 - 1 female sponge rod connection.
- 1 locating gage.
- 1 clip extractor.
- 1 hand extractor.
- 1 vent cleaner.
- 1 oil can.
- 1 storage chest.

SPARE PARTS.

- 1 spare thread clamp screw.
- 1 obturator spindle plate.
- 2 securing screws.

The list and nomenclature of parts, accessories, and spare parts for subcaliber tubes for the 12-inch B. L. mortar model 1890 and 1890 Mt. are the same as for the model 1886, but differ in construction, dimensions, etc.; therefore, in making requisition for parts, etc., the model of mortar must be given in requisition.

Subcaliber tubes, fixtures, accessories, etc., when not in use should always be kept in the special storage chest issued for that purpose.

12-INCH MORTAR CARRIAGE, MODEL 1891.

(Price of carriage, \$6,283.00.)

Weights of principal parts.

Name.	Weight.
	<i>Pounds.</i>
Asimuth circle	3,960
Base ring	16,250
Cap-squares	150
Cap-square blocks	248
Distance ring	1,502
Dust guard	272
Elevating band	182
Elevating-gear bracket, with parts attached	892
Elevating rack	156
Elevating-rack bracket	70
Equalizing pipe, complete	40
Floor plate	381
Gun guides	408
Loading arm, with shaft and swivel arm	245
Pistons and rods	656
Racer	24,500
Ratchet wrench	22
Recoil cylinder, complete, without piston rod	1,804
Separator plates for springs	132
Shell barrow	206
Shell-hoist scoop	68
Shell-hoist screw (with swivel)	133

Weights of principal parts—Continued.

Name.	Weight.
	<i>Pounds.</i>
Shell-hoist-screw handwheel	114
Shell tray	87
Shell-tray false bottom	27
Slide frames	a 11,760
Shell tongs	25
Spring-adjusting screw	82
Springs (coiled)	2,596
Spring-cylinder cap	172
Spring-cylinder extension	1,770
Spring-compression screw	154
Transom	a 2,836
Traversing bracket (lower)	166
Traversing crank	36
Traversing pinion	165
Traversing rack	1,798
Traversing roller	a 3,120
Traversing shaft (vertical)	124
Traversing-shaft sleeve (vertical)	83
Traversing worm wheel	115
Trunion carriage	1,806
Washers for spring column	100
Worm-shaft bearing (left side)	80
Worm-shaft bearing (right side)	114
Worm shaft, with worm	186
Worm-wheel box	890
Bolts	162
Total	79,714

a Estimated.

List of parts of carriage, location, material, correct nomenclature, etc.

Name of part.	Location.	Material	Number.	Bolts.		Kind.
				Length.	Diam-eter.	
				<i>Inches.</i>	<i>Inches.</i>	
Azimuth direction plates	Side frames	Bronze	4			
Azimuth direction screws	Azimuth direction plates	Wrought iron	16	1	1	Screw.
Azimuth circle (section)	Rim of pit	Cast iron	8			
Azimuth circle bolts	Azimuth circle	Wrought iron	16	4 1/2	1 1/2	Through
Azimuth pointer	On racer	Brass	1			
Azimuth pointer screws	Azimuth pointer	do	8	1	1	Screw.
Arm, loading	On shaft	Wrought iron	1			
Arm, loading, shaft	Left side frame	Steel	1			
Arm, loading, shaft nut and washer	On shaft	Wrought iron	a 1			
Base ring	On platform	Gun iron	1			
Buffer (depression)	Transom	Wrought iron	1			
Buffer (depression) cushions	Depression buffer	Felt	9			
Buffer (depression) plates	do	Wrought iron	2			
Buffer (depression) cotter	do	Steel	1			
Buffer, lower, cushions	At bottom of slides	Felt	18			
Buffer, lower, plates	do	Wrought iron	6			
Buffer, lower, securing plates	Slide frames	Steel	4			
Buffer, lower, securing-plate screws	do	Wrought iron	8	1	1	Do.
Cap-squares	On trunion-carriage	Bronze	2			
Cap-square blocks	do	Cast iron	2			
Cap-square block bolt	Cap-square block	Wrought iron	2	18 1/2	1 1/2	Through.
Cap-square block cotter	do	do	2			
Cap-square buffer cushions	Above cap-squares	Felt	32			
Cap-square buffer plates	do	Sheet iron	10			
Distance ring, inner (section)	Traversing rollers	Wrought iron	2			
Distance ring, outer (section)	do	do	2			
Distance-ring bolts (inner)	Inner distance ring	do	4	3	1	Do.
Distance-ring bolts (outer)	Outer distance ring	do	4	3	1	Do.

a Each.

List of parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Bolts.		
				Length.	Diameter.	Kind.
				Inches.	Inches.	
Distance-ring separator...	Distance rings...	Cast iron...	12			Through.
Distance-ring separator-bolts.	do	Wrought iron...	12	1½	1	Do.
Dust-guard plates	Racer	Steel	4			
Dust-guard plate bolts	Dust guard	Wrought iron	16	1		Do.
Dust-guard plate screws	do	do	44	1		Screw.
Dust-guard strips	Traversing rack	do	26			
Dust-guard strip screws	Dust-guard strip	do	251	1		Do.
Elevating direction plates.	Side frames	Bronze	24			
Elevating direction-plate-screws.	do	Wrought iron	16			Do.
Elevating band	On mortar	Steel	1			
Elevating brackets	do	Wrought iron	2			
Elevating-bracket bolts	Bracket to mortar	do	6	1½		Tap.
Elevating hand wheel	Elevating apparatus	Steel	2			
Elevating hand wheel check nut.	do	Wrought iron	2			
Elevating hand wheel check-nut cotter.	do	do	2			
Elevating hand wheel shaft.	do	Steel	2			
Elevating hand wheel locking nut.	do	Wrought iron	2			
Elevating hand wheel washer.	do	Steel	2			
Elevating index finger...	On trunnion carriage.	Bronze	2			
Elevating index-finger screws.	Elevating index finger.	Wrought iron	4	1½		Screw.
Elevating pinion and shaft.	Elevating apparatus.	Steel	2			
Elevating pinion-shaft gear.	do	Bronze	2			
Elevating pinion-shaft nut.	do	Steel	2			
Elevating pinion-shaft washer.	do	do	2			
Elevating split pin	do	do	2			
Elevating rack	On mortar	Bronze	2			
Elevating-rack bolts	Elevating rack to band.	Wrought iron	6	2½		Tap.
Do	Elevating rack to brackets.	do	6	3		Through.
Elevating gear bracket...	On trunnion carriage.	Cast steel	2			
Elevating gear-bracket bolts.	do	Wrought iron	16	4	1	Stud.
Elevating gear-bracket bushing.	do	Bronze	4			
Elevating gear-bracket keys.	do	Steel	24			
Elevating gear-bracket set screws.	do	Wrought iron	2	1½		Set screw.
Equalizing pipe (section), long.	Between recoil cylinder.	do	2			
Equalizing pipe (section) short.	do	do	2			
Equalizing-pipe lower coupling flange.	do	Bronze	2			
Equalizing-pipe upper coupling flange.	do	do	2			
Equalizing-pipe elbow	do	do	1			
Equalizing-pipe flange bolts.	do	Wrought iron	6	3½	1	Through.
Equalizing-pipe flange gasket.	do	Leather	2			
Equalizing-pipe plug	do	Brass	1			Screw plug.
Floor plate	On racer	Cast iron	1			
Floor-plate screws.	Floor plate	Wrought iron	9	1½		Screw.
Gaskets.	Recoil cylinder	Leather	2	6	9	
Do	Throttling plugs	do	14	6	1½	
Guide, mortar	Side frames	Gun iron	2			
Guide, mortar, bolts.	do	Wrought iron	4	7½	1½	Tap.
Head (cylinder)	Recoil cylinder	Bronze	2			
Piston and rod	do	Forged steel	2			
Piston covering	On piston	Bronze	2			
Piston-rod cotters	Piston-rod keys	Steel	2			
Piston-rod taper keys	do	do	2			
Plugs, end passage	Recoil cylinder	Bronze	4			
				2½	Pipe 2	Screw plug.

* Omitted on some carriages.

† Inch thick.

‡ Outside diameter.

List of parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Bolts.		
				Length.	Diam-eter.	Kind.
Plugs, side passage.....	Recoil cylinder.....	Bronze.....	2	Inches.	Inches.	Screw. Do.
Plugs, oil hole.....	Trunnion carriage.....	do.....	4	2	Pipe 1	
Plugs, throttling.....	Recoil cylinder.....	do.....	14	1	Pipe 1	
Racer.....	On traversing rollers.....	Gun iron.....	1		Pipe 1	
Recoil cylinder.....	On side frame.....	Cast steel.....	2			Through.
Recoil-cylinder bolts.....	Recoil cylinder to side frame.....	Wrought iron.....	4	10	1	
Do.....	Recoil cylinder to spring-cylinder extension.....	do.....	4	5	1	Do.
Shell-barrow axle.....	Shell barrow.....	Steel.....	1			Screw.
Shell-barrow axle shoulder washer.....	do.....	Wrought iron.....	2			
Shell-barrow bottom frame.....	do.....	do.....	1			
Shell-barrow brace.....	do.....	do.....	1			
Shell-barrow caster.....	do.....	Cast iron.....	1			
Shell-barrow caster fork and axle.....	do.....	Wrought iron.....	1			
Shell-barrow caster pin.....	do.....	do.....	1			
Shell-barrow guides.....	On racer.....	Cast iron.....	2			
Shell-barrow guide screws.....	do.....	Wrought iron.....	10	1		
Shell-barrow handles.....	Shell barrow.....	do.....	2			
Shell-barrow hand guards.....	do.....	do.....	2			
Shell-barrow linchpin and washer.....	do.....	do.....	2			
Shell-barrow securing pin.....	do.....	do.....	1			
Shell-barrow side frame.....	do.....	do.....	2			
Shell-barrow wheels.....	do.....	Cast iron.....	2			
Shell-hoist hand wheel.....	Shell-hoist screw.....	do.....	1			
Shell-hoist hand wheel handle.....	Shell-hoist hand wheel.....	Wrought iron.....	1			
Shell-hoist hand wheel handle nut.....	On handle.....	do.....	1			
Shell-hoist hand wheel sleeve.....	do.....	Brass.....	1			
Shell-hoist scoop.....	On loading arm.....	Wrought iron.....	1			
Shell-hoist scoop adjusting screw.....	Shell-hoist scoop.....	Steel.....	1			
Shell-hoist scoop blocks.....	do.....	Hardwood.....	2			Newscrew.
Shell-hoist scoop locking nut.....	do.....	Steel.....	1			
Shell-hoist scoop support.....	do.....	do.....	1			Through.
Shell-hoist screw.....	Left side frame.....	do.....	1			
Shell-hoist screw check nuts.....	Shell-hoist screw.....	do.....	4			Do. Tap. Through, rough, turned. Through, rough.
Shell-hoist screw nut.....	do.....	Wrought iron.....	1			
Shell-hoist screw swivel.....	do.....	Bronze.....	1			
Shell-hoist screw swivel nut.....	do.....	do.....	1			
Shell-hoist screw washer.....	do.....	Wrought iron.....	1			
Shell-hoist scoop rivets.....	Shell-hoist scoop.....	do.....	8	1		
Shell-hoist scoop screws.....	do.....	do.....	8	1		
Shell tongs, arms of.....	Shell tongs.....	do.....	2			
Shell tongs, bolts.....	do.....	do.....	1	3		
Shell tongs, links.....	do.....	do.....	2			
Shell tongs, rings.....	do.....	do.....	1			
Shell-tray block.....	Shell tray.....	Hardwood.....	1			
Shell-tray body.....	do.....	Wrought iron.....	1			
Shell-tray bottom.....	do.....	Bronze.....	1			
Shell-tray false bottom.....	do.....	Cast iron.....	1			
Shell-tray frame.....	do.....	Wrought iron.....	1			
Shell-tray handle.....	do.....	do.....	1			
Shell-tray rib.....	do.....	do.....	1			
Side frame.....	On racer.....	Gun iron.....	2			
Side-frame bolts.....	Side frame to racer.....	Wrought iron.....	26	5	1	
Do.....	do.....	do.....	16	8	1	
Do.....	Side frame to transom.....	do.....	6	5	1	
Do.....	do.....	do.....	4	5	1	
Do.....	do.....	do.....	10	9	1	
Side-frame steps.....	Side frames.....	do.....	6			Screw.
Side-frame step screws.....	do.....	do.....	24	1		
Slide liner, inside.....	Trunnion carriage.....	Bronze.....	4			Rivet. Do. Screw.
Slide liner, outside.....	do.....	do.....	4			
Slide-liner rivets.....	Liner.....	Brass.....	23	2		
Do.....	do.....	do.....	2	3		
Slide-liner screws.....	do.....	do.....	24	1		

* Cast solid on some carriages.

† Omitted on some carriages.

List of parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number	Bolts.		
				Length.	Diameter.	Kind.
Spring-adjusting screw....	Trunnion carriage..	Steel.....	2	Inches.	Inches.	
Spring-adjusting screw locking nut.	Spring-adjusting screw.	do.....	2	16	8	
Spring-adjusting screw washer.	do.....	do.....	2	Hardened.		
Spring-compression screw.	For assembling springs.	do.....	1			
Spring-compression screw nuts.	Spring-compression screw.	do.....	2			
Spring-compression screw washer.	do.....	Cast iron.....	1			
Spring cylinder.....	Cast inside frame..	Gun iron.....	2			
Spring-cylinder cap.....	do.....	do.....	2			
Spring-cylinder cap bolts.	Spring-cylinder cap	Wrought iron..	4	5	1	Stud.
Spring-cylinder extension.	Spring cylinder.....	Gun iron.....	2			
Spring-cylinder extension bolts.	To spring cylinder..	Wrought iron..	4	5	1	Stud.
Do.....	do.....	do.....	14	5	1	Through.
Springs (coiled).....	In spring cylinder..	Steel.....	22			
Spring-separator plates.	Each end of springs.	do.....	41			
Spring washers, top and bottom.	Spring column.....	Wrought iron..	4			
Stop (elevation).....	Transom.....	Hickory.....	1			
Stuffing-box bushing.	Recoil cylinder....	Bronze.....	2			
Stuffing-box followers.	do.....	do.....	4			
Stuffing-box glands.	do.....	do.....	4			
Suspension rod.....	Equalizing pipe to floor plate.	Wrought iron..	1			
Suspension-rod nuts.....	do.....	do.....	4			
Swivel balls.....	Swivel.....	Steel.....	12			
Swivel bracket.....	Left side frame....	Cast iron.....	1			
Swivel-bracket bolts.....	Side frames.....	Wrought iron..	4	2	1	Tap.
Swivel-nut arm.....	On loading-arm shaft.	do.....	1			
Swivel washers.....	Swivel.....	Steel.....	3			
Transom.....	Joining side frames.	Gun iron.....	1			
Transom-racer bolts.....	Transom to racer....	Wrought iron..	6	3	1	Tap.
Do.....	do.....	do.....	2	3	1	Do.
Traversing-bracket bushing.	On bracket.....	Bronze.....	1			
Traversing bracket (lower).	On racer.....	Cast iron.....	1			
Traversing-bracket (lower) bolts.	Bracket.....	Wrought iron..	3	3	1	Tap.
Do.....	do.....	do.....	2	5	1	Through.
Traversing cranks.....	On worm shaft.....	do.....	2			
Traversing-crank handles.	On crank.....	do.....	2			
Traversing-crank keys.....	do.....	do.....	2			
Traversing-crank sleeves.	On crank handles..	Brass.....	2			
Traversing pinion.....	On vertical shaft....	do.....	1			
Traversing key.....	do.....	Steel.....	1			
Traversing rack (section).	On base ring.....	Gun iron.....	6			
Traversing-rack bolts.....	Traversing rack.....	Wrought iron..	48	2	1	Tap.
Traversing rollers.....	On base ring.....	Steel.....	24			
Traversing shaft (vertical).	Through bracket on racer.	do.....	1			
Traversing-shaft (vertical) nut.	Vertical traversing shaft.	do.....	2			
Traversing-shaft (vertical) sleeve.	Around shaft.....	Wrought iron..	1			
Traversing-shaft (vertical) split pin.	Vertical traversing shaft.	Steel.....	1			
Traversing-shaft (vertical) washer.	do.....	do.....	2			
Traversing worm.....	Traversing-worm shaft.	do.....	1			
Traversing-worm pin.....	Traversing worm....	do.....	1			
Traversing-worm gear.....	On vertical shaft....	Bronze.....	1			
Traversing-worm key.....	Traversing-worm shaft.	Steel.....	1			
Traversing-worm shaft.....	Between side frames	do.....	1			
Traversing-worm gear key.	On vertical shaft....	do.....	1			
Trunnion bushing.....	On trunnion carriage.	Bronze.....	2			
Trunnion carriage.....	On side frames.....	Cast steel.....	2			
Washer, bottom centering.	Spring-compression screw.	Cast iron.....	1			
Worm-shaft bracket.....	Right side frame....	do.....	1			
Do.....	Left side frame....	do.....	1			
Worm-shaft bearing bolts.	Right side frame....	Wrought iron..	3	2	1	Tap.
Do.....	do.....	do.....	3	6	1	Through.
Do.....	Left side frame....	do.....	6	4	1	Do.

List of parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Bolts.		
				Length.	Diameter.	Kind.
Worm-shaft middle bearing.	Worm box.....	Cast iron.....	1	Inches.	Inches.	
Worm-shaft middle bearing bolts.	.....do.....	Wrought iron...	5	2		Tap.
Worm-wheel box.....	Right side frame	Cast iron.....	1			
Worm-wheel box bolts	Worm-wheel box...	Wrought iron...	4	4½	1½	Through.
Worm-wheel box cover.....	.....do.....	Cast iron.....	1			
Worm-wheel box cover screws.	.....do.....	Wrought iron...	6	1½		Screw.
Wrench (ratchet)	With carriage	Malleable iron				

Parts for steel mortar.

Distance pieces.....	Undermortarguides	Gun iron.....	2			
Distance-piece bolts.....	Distance pieces.....	Wrought iron...	4	9½	1½	Tap.
Distance pieces for elevating racks.	Elevating rack.....	Gun iron.....	2			
Distance piece for elevating rack bolts.	Distance pieces to elevating band.	Wrought iron...	6		1	Tap.
Elevating brackets.....	On mortar.....	do.....	2			Do.
Elevating-bracket bolts.....	Bracket to mortar...	do.....	6	1½	1	Tap.
Do.....	Bracket to rack.....	do.....	6	3		Through.
Elevating hand wheel locking nut.	Elevating apparatus	do.....	2			
Elevating hand wheel locking-nut washer.	Chained to carriage.	do.....	2			
Packing rings.....	Mortar trunnions.....	do.....	2			
Supporting bracket for spring cylinder.	Attached to racer..	Cast iron.....	2			
Supporting-bracket bolts..	Supporting bracket to racer.	Wrought iron...	4			Tap.

^a Dowel pins.

(Price of shot tongs, \$24 each.)

12-INCH MORTAR CARRIAGE, MODEL 1896.

(Price of carriage, \$5,200.)

Weight of principal parts.

Name.	Weight.
	Pounds.
Asimuth circle.....	2,498
Asimuth-circle brackets (8).....	528
Angle brackets for floor plates (16).....	820
Base ring.....	14,500
Cap squares (2).....	480
Cylinders, complete (2).....	1,850
Cylinder brackets (4).....	880
Distance ring.....	1,485
Dust guard.....	286
Elevating gear wheel, shaft, and pinion.....	275
Elevating handwheels and shaft.....	167
Elevating rack.....	145
Equalizing pipe.....	46
Floor plates around carriage (16).....	2,899
Floor plate, removable.....	210
Fulcrum shaft.....	440
Guides and cap, with buffer (2).....	806
Ladder and brace.....	70
Piston rod and crosshead (2).....	840
Racer.....	28,500
Saddle or top carriage.....	4,970
Spring box.....	1,520
Spring-box brackets (2).....	2,340
Spring rods, washers, etc.....	4,440
Traversing rack.....	1,840
Traversing rollers.....	3,012
Vertical traversing shaft, pinion, worm, and worm wheel.....	604
Vertical traversing-shaft bracket.....	110
Worm-box pedestal bracket and cover.....	480
Bolts.....	120
Shot truck.....	490
Total weight of carriage.....	76,511

List of parts of carriage, location, material, correct nomenclature, etc.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inch.	Inch.		
Azimuth circle.....	Surrounding racer.....	Cast iron.....	1				In 8 sections.
Azimuth pointer.....	On racer.....	Brass.....	1				
Base ring.....	On platform.....	Cast iron.....	1				
Bolts (hexagonal head).	Azimuth-circle bracket foot.	Wrought iron.....	16	1.25	3.0		
Do.....	Azimuth-circle bracket top.	do.....	16	0.75	2.5		
Do.....	Cap-squares on top carriage.	do.....	4	2.5	9.0	4	
Do.....	Cap-squares on guides.....	do.....	8	1.25	6.25	8	
Do.....	Distance-ring joints.....	do.....	16	1.0	8.125		
Do.....	Distance-ring separators.....	do.....	12	1.125	14.75		
Do.....	Dust guard to racer.....	do.....	42	0.5	1.25		
Do.....	Dust-guard joint.....	do.....	16	0.375	0.75	16	
Do.....	Elevating rack.....	do.....	4	1.375	2.625		
Do.....	Floor-plate angle iron.....	do.....	8	1.0	2.5	8	
Do.....	Guides on recoil cylinder.....	do.....	8	1.5	5.0	8	
Do.....	Pedestal-bracket cover.....	do.....	8	0.375	1.25		
Do.....	Recoil-cylinder bracket.....	do.....	8	1.5	5.0		
Do.....	Traversing rack.....	do.....	12	0.75	3.0		
Do.....	Vertical-shaft pedestal bracket.	do.....	8	1.0	3		
Do.....	Vertical-shaft bottom bracket.	do.....	4	1.25	3.25		
Bolts (square head)	Azimuth-circle joint.....	do.....	8	1.25	4.5	8	
Do.....	Through azimuth circle and angle iron.	do.....	8	1.25	4.75	8	
Brackets, azimuth circle.	On base ring.....	Cast steel.....	8				
Brackets, recoil cylinder.	On racer.....	do.....	4				
Bracket, pedestal.	do.....	Cast iron.....	1				
Bracket cover.....	Pedestal bracket.....	do.....	1				
Bracket, vertical shaft.	Under racer.....	do.....	1				
Buffer plates.....	At top of guides.....	Steel plate.....	12				
Buffer cushions.....	do.....	Balsa.....	12				
Bushings.....	Crosshead.....	Bronze.....	2				
Do.....	Recoil-cylinder bracket.....	do.....	4				
Do.....	Spring-box bracket.....	do.....	2				
Do.....	Spring washer.....	do.....	6				
Do.....	Top carriage, mortar end.....	do.....	2				In halves, 4 pins in each.
Do.....	Top carriage, lower end.....	do.....	2				
Do.....	Top carriage, hand-wheel shaft.....	do.....	1				
Do.....	Top carriage, elevating-gear shaft.....	do.....	3				3 sizes.
Do.....	Vertical-shaft pedestal bracket.	do.....	3				Do.
Do.....	Vertical-shaft bottom bracket.	do.....	1				
Collar.....	Elevating-gear shaft end.....	Steel.....	1				
Do.....	Elevating-gear shaft.....	do.....	2				
Do.....	Hand-wheel-shaft end.....	do.....	1				0.25 taper pin. Shrunken on.
Do.....	Piston rod.....	do.....	2				
Coupling, emptying.	Equalizing pipe.....	Bronze.....	1				
Cranks.....	Traversing worm shaft.....	Wrought iron.....	2				With brass sleeve.
Crank pins.....	In top carriage.....	Steel.....	2				0.25-inch split pin.
Crossheads.....	Between guides.....	do.....	2				
Crosshead liners.....	Crosshead.....	Bronze.....	2				Made right and left.
Do.....	do.....	do.....	2				
Cylinders, recoil.....	Fulcrum on racer.....	Cast steel.....	2				
Cylinder heads.....	Top of recoil cylinder.....	Bronze.....	2				Leather packing.
Cylinder-head washers.	Between head and cylinder.	Brass.....	2				
Distance ring, inner.....	Traversing roller.....	Wrought iron.....	1				In halves.
Distance ring, outer.....	do.....	do.....	1				Do.
Distance-ring joint plates.	On distance ring.....	do.....	4				
Distance pieces.....	Separator between distance rings.	Cast iron.....	12				
Direction plates, traversing.	On pedestal bracket for traversing gear.	Bronze.....	2				Made right and left.
Direction plates, elevate and depress.	Top carriage.....	do.....	4				Do.

List of parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks
				Inch.	Inch.		
Dust guard	On racer	Steel plate...	1				Made in 4 sections
Elevating gear	Engaging handwheel pinion.	Bronze	1				45 teeth.
Elevating hand-wheel pinion.	Handwheel shaft	Forged steel.	1				12 teeth.
Elevating hand-wheel hub.	.....do	Cast iron	1				
Elevating hand-wheel rims and spokes.	Handwheel hub and pinion.	Wrought iron.	2				Complete set.
Elevating pinion ..	Elevating shaft	Forged steel.	1				12 teeth.
Elevating rack	On mortar	Cast steel	1				With 26 teeth.
Elevating hand-wheel shaft.	Top carriage	Steel	1				Two keys 0.438-inch.
Elevating-gear shaft.	.....do .....	.....do	1				Two keys 0.5-inch.
Pulcrum shaft	In top carriage and racer.	Steel	1				
Friction cone	Elevating-gear shaft	Cast steel	1				Two keys 1.25-inch.
Friction washer .....	.....do	Cast iron	1				
Friction clamp bushing.	Top carriage, handwheel shaft.	Bronze	1				
Floor-plate angle iron.	Masonry and azimuth circle.	Wrought iron.	16				Two sizes of bolt.
Floor plate	On racer	Cast iron	1				
Do	Surrounding azimuth circle.	.....do	16				
Floor-plate rings.	In floor plate	Wrought iron.	32				With eyebolts.
Graduated strips.	Azimuth circle	Brass	8				
Guides	Top of recoil cylinder	Cast steel	4				
Guide caps	Top of guides .....	.....do	2				
Hand nut	Elevating handwheel shaft.	Steel	1				With washer.
Implement box ..	With carriages	Ash	1				With lock and handles.
Liners	Spring guide rod	Brass tubing.	5				
Ladder	In pit	Wrought iron.	1				With braces.
Name plate	On top carriage	Bronze	1				
Nuts	Elevating-gear shaft	Steel	2				One 0.875 inch thick; one 1.5 inches thick.
Nuts, piston rod.	Screwed in crosshead .....	.....do	2				
Nuts	Spring rod .....	.....do	10				Five 2.75 inches thick; five 1.5 inches thick.
Oil plug	In carriage	Brass	2				0.625-inch tap.
Do .....	.....do .....	.....do	2				0.375-inch tap.
Oil cans	With carriage .....	.....do	1				Capacity 1 quart.
Do .....	.....do .....	.....do	1				Capacity 1 quart.
Plugs	Side of recoil cylinder	Bronze	4				With leather washer.
Plugs, recoil adjusting.	.....do .....	.....do	4				With washer.
Do .....	.....do .....	.....do	2				Do.
Plugs	Ends of recoil cylinder .....	.....do	4				With leather washer.
Plugs, filling	In recoil cylinder .....	.....do	2				
Plugs, closing hole.	Side of recoil cylinder .....	.....do	2				
Plug	Emptying coupling	Wrought iron.	1				Leather washer.
Packing rings	Cylinder bottom and head.	Steel	4				
Packing-ring followers.	.....do	Bronze	4				
Packing-ring extractor.	With carriages	Steel	2				
Packing-neck rings.	Bottom of recoil cylinder	Bronze	2				
Pistons and rods ..	Recoil cylinder	Steel	2				
Piston covering ..	On piston	Bronze	2				Forced on.
Pipe, equalizing ..	Between recoil cylinders	Copper	1				2 parts
Pipe collars	Ends of equalizing pipe	Steel	4				
Pipe followers	Equalizing pipe	Bronze	4				
Pipe packings .....	.....do	Leather	4				
Pipe, oil	In pedestal bracket	Brass	1				
Racer	Traversing roller	Gun iron	1				
Screws	Azimuth pointer	Brass	4	0.625	1.0		Roundhead.
Do	Azimuth circle graduated strips.	.....do	72	0.25	0.75		Do.
Do	Direction plate .....	.....do	18	0.25	0.5		Do.
Do	Elevating rack	Wrought iron.	2	1.875	2.625		Round slotted head.

List of parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Location.	Material.	Number.	Diameter.		Length.	Nuts.	Remarks.
				<i>In.</i>	<i>In.</i>			
Screws.....	Floor plate.....	Wrought iron	16	0.75	2.75			Countersunk.
Do.....	Floor plate on racer.....	do	13	0.5	1.25			Do.
Do.....	Ladder to pit.....	do	3	0.75	2.0		3	Do.
Do.....	do.....	do	1	0.75	1.75		1	Do.
Do.....	Liners on crosshead.....	Brass	32	0.375	1.25			Roundhead.
Do.....	Name plate, top carriage.....	do	2	0.25	0.5			Round slotted head.
Do.....	Spring-box bracket.....	Wrought iron	2	2.0	4.5			Headless.
Do.....	Spring-rod liner.....	Brass	30	0.25	0.75			Countersunk.
Do.....	Traversing crank.....	Wrought iron	2	0.875	2.25			
Screws, assembling	With carriage for spring rod.....	Steel.....	5	2.0	22		5	
Set screws.....	Collar on elevating shaft.....	do	2	0.625	0.875			
Do.....	do.....	do	1	0.625	0.75			
Screw-drivers.....	With carriage.....	Tool steel.....	2					2 sizes; with wooden handles.
Do.....	do.....	do	2					2 sizes; for wrench.
Shot tongs.....	do.....	Steel.....	1					Complete.
Studs.....	Spring-box bracket.....	Wrought iron	14	2.0	8.025	14		
Springs, inside.....	On spring rod.....	Spring steel.....	25					
Springs, outside.....	do.....	do	25					
Spring box.....	Fulcrumed in spring-box bracket.....	Cast iron.....	1					
Spring-box brackets.....	Under racer.....	do	2					Made right and left.
Spring cap.....	On spring rod against top carriage.....	Cast steel.....	1					
Spring guide rods.....	In spring box and top carriage.....	Steel.....	5					
Spring guide-rod plugs.....	In spring rod.....	Bronze.....	5					
Top carriage.....	Fulcrumed on racer.....	Gun iron.....	1					
Top-carriage cap-squares.....	Top carriage.....	do	2					
Traversing rollers.....	Base ring.....	Steel.....	24					
Traversing rack.....	Bolted to base ring.....	Cast iron.....	1					150 teeth.
Traversing pinion.....	On traversing vertical shaft.....	Bronze.....	1					16 teeth; one key 0.688-inch.
Traversing worm wheel.....	Worm shaft.....	Steel.....	1					0.488-inch key.
Traversing worm shaft.....	Traversing vertical shaft.....	Bronze.....	1					32 teeth; one key, 0.688-inch.
Traversing vertical shaft.....	In pedestal bracket.....	Steel.....	1					
Washer.....	Through racer and pedestal bracket.....	do	1					1 split pin, 2 washers, 2 nuts.
Do.....	Handwheel shaft.....	do	1					
Washers, spring compression.....	On crank pin.....	Bronze.....	2					
Washers, separating springs.....	Assembling screws.....	Cast iron.....	5					
Washers.....	On spring rod.....	Steel.....	15					
Washers, spring stopper.....	do.....	do	5					Fastened with 0.625-inch taper pins.
Wrench.....	On spring rod against nuts.....	do	5					
Do.....	For piston-rod nuts.....	do	1					
Do.....	For spring-rod nuts.....	do	2					
Do.....	For 2.5 and 2 inch nut.....	do	1					
Do.....	For 1.75 and 1.5 inch nut.....	do	1					
Do.....	For 1.875 and 1.25 inch nut.....	do	1					
Do.....	For 1.25 and 1 inch nut.....	do	1					
Do.....	For 0.75 and 0.625 inch nut.....	do	1					
Do.....	For 0.5 and 0.375 inch nut.....	do	1					
Do.....	For screw-drivers.....	do	2					2 kinds.
Do.....	For recoil-cylinder plug.....	do	1					
Do.....	For gear-wheel shaft nut.....	do	1					
Do.....	Spanner wrench, cylinder head.....	do	1					
Do.....	Spanner wrench, cylinder follower.....	do	1					
Do.....	Box wrench, traversing rack bolts.....	do	1					
Do.....	12-inch monkey wrench.....	do	1					

For Mortars—continued.

	Price each.		Price each.
4 pairs gunner's sleeves per pair..	\$1.18	2 files, half round, smooth.....	\$0.13
4 gunner's lanyards	1.15	2 files, three-cornered .....	.08
4 loading trays	14.00	1 copper hammer.....	1.25
1 metal scraper (for removing paint, etc.)..	.43	1 boiler-maker's hammer.....	.75
12 silk wipers, or cotton waste a.....	.10	1 hand mallet.....	.16
4 balls twine, assorted per pound..	.15	2 oilers, half pint.....	.13
2 pounds copper wire, No. 12 do....	.20	1 pair cutting pliers.....	.60
2 pounds copper wire, No. 16 do....	.20	1 monkey wrench, 12-inch .....	.52
1 quire emery cloth, No. 00..... per quire..	.44	1 monkey wrench, 18-inch, with screw-	
6 wagon sponges..... per pound..	2.88	driver attachment.....	1.60
2 files, flat, dead smooth.....	.13	2 long-handled mallets.....	.60
2 files, round, second cut.....	.07		

For Carriages.

	Price each.		Price each.
1 spanner wrench for hydraulic cylinder follower.....		1 single wrench for 1½-inch nut	
1 spanner wrench for hydraulic cylinder head.....		1 single wrench for 1½-inch nut	
1 double wrench for ½-inch and ¼-inch nuts.....		1 single wrench for 2½-inch nut	
1 double wrench for ¼-inch and ¼-inch nuts.....		1 oiler, 1 quart.....	
1 single wrench for 1-inch nut		2 lifting bolts for stuffing-box packing rings	
4 lifting hooks for floor plates.....		2 nut tighteners (shot-elevating screw)...	
1 single wrench for 1½-inch nut		1 screw-driver, steel	
1 single wrench for 1½-inch nut		1 screw-driver, with wooden handle	
1 single wrench for 1½-inch nut (for equal- izing pipe).....		The following articles being too large are not to be kept in the chest:	
		1 wrench for lock nut on spring compres- sor screw	
		8 water buckets, indurated fiber	

CONTENTS OF COMBINATION ARMAMENT CHEST FOR FOUR 12-INCH B. L. MORTARS,
CAST IRON, MODELS 1886 AND 1886 M; AND FOUR 12-INCH S. R. MORTAR CAR-
RIAGES, MODEL 1896.

For Mortars.

	Price each.		Price each.
2 bar screw-drivers for vent cover, roller crank, and oil-hole screws	\$0.75	1 boiler-maker's hammer.....	\$0.75
2 bar screw-drivers for tray cap securing (tray back) latch spring-bolt shoe screws.....	.75	4 gunner's quadrants.....	16.00
2 bar screw-drivers for securing (tray back) latch catch nut.....	1.25	1 bronze drift (large).....	.40
2 bar screw-drivers for lower pinion nut..	1.25	1 bronze drift (small).....	.25
2 bar screw-drivers for bronze bushing crank lock	1.75	4 gunner's punches, for vent. ....	.90
1 obturator nut wrench	5.70	4 gunner's reamers, for vent.	1.00
1 obturator nut clamp screw wrench.....	4.44	4 gunner's gimlets, for vent.....	.55
1 locking nut washer.....	2.60	4 gunner's pouches.....	2.50
4 primer keys.....	1.50	4 pairs gunner's sleeves, per pair.....	1.18
1 pin punch .....	.30	4 gunner's lanyards	1.15
4 tit wrenches for obturator spindle.....	1.00	1 metal scraper (for removing paint, etc.).....	.43
4 pressure plug wrenches.....	1.90	12 silk wipers, or cotton waste b.....	.10
1 quire emery cloth, No. 00, per quire....	.44	4 balls twine, assorted per pound..	.15
6 wagon sponges, per pound	2.88	2 pounds copper wire, No. 12 do....	.20
2 files, flat, dead smooth.....	.13	2 pounds copper wire, No. 16 do....	.20
2 files, round, second cut.....	.07	1 hand mallet.....	.16
2 files, half round, smooth.....	.13	2 oilers, half pint.....	.13
2 files, three-cornered .....	.08	1 pair cutting pliers .....	.60
1 copper hammer.....	1.25	1 monkey wrench, 12-inch .....	.52
		1 monkey wrench, 18-inch, with screw- driver attachment	1.60
		2 long-handled mallets.....	.60

a Ten pounds of cotton waste will be issued in lieu of 12 silk wipers.

b 12 pounds of cotton waste will be issued in lieu of 12 silk wipers.

	Price each.	
	Model 1891.	Model 1896.
1 ratchet ball-bearing spring.....	each..	\$0.10
1 set oil-hole plugs.....	each..	.25
1 set taper pins.....	each..	.20
1 set split pins for each model of carriage.....	each..	.23
1 set parts of equalizing and pipe-throttling device, complete, per each model of carriage.....	per set..	11.51
1 set screws for floor plates per each model of carriage.....	each..	.03
1 set dust-guard bolts per each model of carriage.....	do..	.10
1 set bolts and springs per each model of carriage.....	per set..	.85
1 set rivets for same.....	per set..	16.50
1 set felt buffers, complete, and metal separators, 12-inch mortar carriage, model 1891.....	per set..	1.75
1 set azimuth pointers with screws.....	each..	.10
1 set spring rod plugs, 12-inch mortar carriages, model 1896.....	do..	1.00
1 set drain plugs for elevating and traversing brackets and casings.....	do..	.23
1 set cables for electrical firing apparatus.....	per set..	1.50
1 gross screws for name and direction plates.....	each..	.03
2 dozen hexagonal nuts, assorted, U. S. S., $\frac{1}{4}$ to 1 $\frac{1}{2}$ inch.....	per doz..	1.92

NOTE.—A complete set of these parts as far as applicable to carriages mounted at any post should be kept on hand, except equalizing and pipe-throttling device, which will be issued to district armament officers to be retained at arsenals.
In ordering parts of any carriage, always specify the kind, model, and number of carriage for which parts are required.

MAKING REQUISITIONS FOR SPARE PARTS.

In making requisitions for spare parts for either gun or carriage the nomenclature given in this manual must be strictly followed. The failure to do so makes it difficult to always determine at the issuing arsenal exactly what parts are to be ordered issued and the failure to do so may cause serious delay in the action on the requisition.

When spare parts or tools for either seacoast or rapid-fire guns or carriages are called for to replace unserviceable parts or tools, the unserviceable parts or tools, after repairs or exchanges are made, should be sent to Watervliet and Watertown arsenals, respectively, for gun and carriage parts.

For annual allowance of paints and material for cleaning and preservation, see Supply Table, page —.

For further details as to care, instruction, etc., see pamphlets issued by Ordnance Department, "Instructions for mounting, etc., 12-inch mortar carriages, model 1891," and "Instructions for mounting, etc., for mortar carriages, model 1896, for 12-inch mortars (steel)."

CONTENTS OF COMBINATION ARMAMENT CHEST FOR FOUR 12-INCH B. L. MORTARS, CAST IRON, S. H., MODELS 1886 AND 1886 M; AND FOUR 12-INCH S. R. MORTAR CARRIAGES, MODEL 1891.

For Mortars.

	Price each.		Price each.
2 bar screw-drivers for vent cover, roller crank and oil-hole screws.....	\$0.75	1 locking-nut washer.....	\$2.66
2 bar screw-drivers for tray cap securing (tray back) latch spring-bolt shoe screws.....	.75	4 primer keys.....	1.50
2 bar screw-drivers for securing (tray back) latch-catch nut.....	1.26	1 pin punch.....	.30
2 bar screw-drivers for lower pinion nut.....	1.25	4 tit wrenches for obturator spindle.....	1.00
2 bar screw-drivers for bronze bushing crank lock.....	1.75	4 pressure-plug wrenches.....	1.90
1 obturator-nut wrench.....	5.70	4 gunner's quadrants.....	16.00
1 obturator-nut clamp screw wrench.....	4.44	1 bronze drift (large).....	.40
		1 bronze drift (small).....	.25
		4 gunner's punches, for vent.....	.90
		4 gunner's reamers, for vent.....	1.00
		4 gunner's gimlets, for vent.....	.55
		4 gunner's pouches.....	2.50

For Mortars—continued.

	Price each.		Price each.
4 pairs gunner's sleeves per pair..	\$1.18	2 files, half round, smooth.....	\$0.13
4 gunner's lanyards	1.16	2 files, three-cornered .....	.08
4 loading trays	14.00	1 copper hammer.....	1.25
1 metal scraper (for removing paint, etc.)..	.43	1 boiler-maker's hammer.....	.75
12 silk wipers, or cotton waste .....	.10	1 hand mallet .....	.16
4 balls twine, assorted per pound..	.15	2 oilers, half pint.....	.13
2 pounds copper wire, No. 12 do....	.20	1 pair cutting pliers .....	.60
2 pounds copper wire, No. 16 do....	.20	1 monkey wrench, 12-inch .....	.52
1 quire emery cloth, No. 00..... per quire..	.44	1 monkey wrench, 18-inch, with screw- driver attachment.....	1.60
6 wagon sponges..... per pound..	2.38	2 long-handled mallets.....	.60
2 files, flat, dead smooth.....	.13		
2 files, round, second cut.....	.07		

For Carriages.

	Price each.		Price each.
1 spanner wrench for hydraulic cylinder follower		1 single wrench for 1½-inch nut	
1 spanner wrench for hydraulic cylinder head.....		1 single wrench for 1½-inch nut	
1 double wrench for ½-inch and ¾-inch nuts.....		1 single wrench for 2½-inch nut	
1 double wrench for ½-inch and 1-inch nuts		1 oiler, 1 quart.....	
1 single wrench for 1-inch nut		2 lifting bolts for stuffing-box packing rings	
4 lifting hooks for floor plates.....		2 nut tighteners (shot-elevating screw)...	
1 single wrench for 1½-inch nut		1 screw-driver, steel	
1 single wrench for 1½-inch nut		1 screw-driver, with wooden handle	
1 single wrench for 1½-inch nut (for equal- izing pipe).....		The following articles being too large are not to be kept in the chest:	
		1 wrench for lock nut on spring compres- sor screw	
		8 water buckets, indurated fiber	

CONTENTS OF COMBINATION ARMAMENT CHEST FOR FOUR 12-INCH B. L. MORTARS,
CAST IRON, MODELS 1886 AND 1886 M; AND FOUR 12-INCH S. R. MORTAR CAR-
RIAGES, MODEL 1886.

For Mortars.

	Price each.		Price each.
2 bar screw-drivers for vent cover, roller crank, and oil-hole screws	\$0.75	1 boiler-maker's hammer.....	\$0.75
2 bar screw-drivers for tray cap securing (tray back) latch spring-bolt shoe screws.....	.75	4 gunner's quadrants.....	16.00
2 bar screw-drivers for securing (tray back) latch catch nut.....	1.25	1 bronze drift (large).....	.40
2 bar screw-drivers for lower pinion nut.....	1.25	1 bronze drift (small) .....	.25
2 bar screw-drivers for bronze bushing crank lock	1.75	4 gunner's punches, for vent. ....	.90
1 obturator nut wrench	5.70	4 gunner's reamers, for vent	1.00
1 obturator nut clamp screw wrench.....	4.44	4 gunner's gimlets, for vent .....	.55
1 locking nut washer.....	2.60	4 gunner's pouches	2.60
4 primer keys.....	1.50	4 pairs gunner's sleeves, per pair.....	1.18
1 pin punch .....	.80	4 gunner's lanyards	1.15
4 tit wrenches for obturator spindle.....	1.00	1 metal scraper (for removing paint, etc.).....	.43
4 pressure plug wrenches.....	1.90	12 silk wipers, or cotton waste .....	.10
1 quire emery cloth, No. 00, per quire....	.44	4 balls twine, assorted per pound..	.15
6 wagon sponges, per pound	2.38	2 pounds copper wire, No. 12 do....	.20
2 files, flat, dead smooth.....	.13	2 pounds copper wire, No. 16 do....	.20
2 files, round, second cut.....	.07	1 hand mallet .....	.16
2 files, half round, smooth.....	.13	2 oilers, half pint.....	.13
2 files, three-cornered .....	.08	1 pair cutting pliers .....	.60
1 copper hammer.....	1.25	1 monkey wrench, 12-inch .....	.52
		1 monkey wrench, 18-inch, with screw- driver attachment	1.60
		2 long-handled mallets.....	.60

^a Ten pounds of cotton waste will be issued in lieu of 12 silk wipers.

^b 12 pounds of cotton waste will be issued in lieu of 12 silk wipers.

For Carriage.

	Price each.		Price each.
1 wrench for screw-driver.....		1 double wrench for 1½-inch and 1½-inch nuts	
1 handle for wrench for hydraulic-cylind- er plug		1 double wrench for 1½-inch and 1½-inch nuts	
1 wrench for hydraulic-cylinder plug....		2 screw-drivers, steel	
1 wrench, box, for ½-inch tap bolts on training rack.....		2 screw-drivers, with wooden handles....	
1 wrench for gear-wheel shaft nut		2 lifting bolts for stuffing-box packing rings (not used after carriage No. 227).	
4 lifting hooks, for floor plates		1 oiler, 1 quart.....	
1 spanner wrench for hydraulic-cylinder follower		The following articles being too large are not to be kept in the chest:	
1 spanner wrench for hydraulic-cylinder head.....		1 wrench for piston-rod nut	
1 double wrench for ½-inch and ½-inch nuts		2 wrenches for spring-rod nuts	
1 double wrench for ½-inch and ½-inch nuts		1 wrench, double, for 2½-inch and 2½-inch nuts	
1 double wrench for 1-inch and 1½-inch nuts		8 water buckets, indurated fiber.....	

**CONTENTS OF COMBINATION ARMAMENT CHEST FOR FOUR 12-INCH B. L. MORTARS,
STEEL, MODELS 1890 AND 1890 M1; AND FOUR 12-INCH S. R. MORTAR CARRIAGES,
MODEL 1891.**

The contents of these chests are the same as for the 12-inch cast-iron mortars,
model 1886, etc., and model 1891 carriages. See page 216.

**CONTENTS OF COMBINATION ARMAMENT CHEST FOR FOUR 12-INCH B. L. MORTARS,
STEEL, MODELS 1890 AND 1890 M1; AND FOUR S. R. CARRIAGES, MODEL 1896.**

The contents of these chests are the same as those for the cast-iron steel-hooped
mortars and model 1896 carriages. See page 217.

LOADING TRAYS FOR MORTARS.

Loading trays are no longer issued for the mortars mounted on model 1896 car-
riages, provision for loading having been made on the ammunition truck.

Box wrenches with 1-inch openings have been issued with mortar carriages Nos.
244 to 259, both inclusive; and Nos. 261 to 268, both inclusive. These wrenches are
for use on bolts on training rack which in these carriages have a 1-inch hexagonal
head.

SAFETY LANYARD ATTACHMENT.

All disappearing carriages are to be supplied with a safety lanyard attachment, in
the use and adjustment of which the following instructions should be followed:

INSTRUCTIONS FOR USING AND ADJUSTING SAFETY LANYARD ATTACHMENTS.

1. This attachment is designed to prevent the accidental firing, due to a pull on
the lanyard, of a gun mounted on a disappearing carriage at all times when the
piece is from battery.

2. This is effected by a reel actuated by a flat spring in a case. This reel keeps
the lanyard always drawn up to the case (or to the lanyard guide in the designs
provided with guides), where it is locked by a pawl. This pawl is automatically
released by the operation of a cam on the elevating arm when the piece goes into
battery, and a pull on the lanyard will then unwind the copper cable on the reel
and permit the primer to be fired.

3. The initial tension of the spring should be such as to cause the copper cable to be wound up with certainty, with the lanyard attached. Should the initial tension be much in excess of this, the spring may become coiled solid before the entire length of cable is unwound and withdrawn from the reel; unnecessary strain is also brought on the cable when the ring at its end suddenly strikes the case or the lanyard guide.

4. The proper adjustment will be made in the first instance by the ordnance machinist when the attachments are applied to the carriages.

5. Should subsequent adjustments be required, the method to be pursued is as follows:

(a) To increase the tension of the spring:

Loosen the nut on the spring shaft (this protrudes from the center of the case).

With a monkey wrench hold the squared end of the spring shaft firmly to prevent the spring unwinding when the pin is removed.

Remove the spring-shaft pin and by means of the wrench turn the spring shaft in a counter-clockwise direction.

The pin may be inserted at any quarter turn of the shaft.

The degree of tension must be determined by trial.

Tighten up the spring-shaft nut.

(b) To decrease the initial tension:

Loosen the spring-shaft nut, hold the spring shaft as before, remove the pin, and allow the shaft to turn in a clockwise direction one or more quarter turns and insert the pin as before.

Tighten up the spring-shaft nut.

ELECTRIC FIRING ATTACHMENTS.

All disappearing carriages are shortly to be arranged to permit electric firing, either individually by a key on the sighting platform or one on the working platform, or in salvo—by a key in the battery commander's station. To arrange for firing by whichever of these methods is desired, a double-pole, double-break, double-throw switch in the Signal Corps' outlet box is turned to the proper (indicated) position. This connects with a source of electrical power two of the four wires from this switch to the carriage; namely, either the two wires tapped directly into power mains in the emplacement (for individual or "gun" fire), or the two wires leading back through the battery commander's firing key to the power mains (for battery or salvo fire). The latter two wires are led without any interrupting switch or key to the "safety firing switch" on the left chassis, connecting with the front lug of the top carriage. The former two wires are broken at the two firing keys on the carriage in such manner that the closing of either key closes the circuit; they then go to the safety firing switch. This switch is designed to break the firing circuit automatically as soon as the top carriage has recoiled about 3 inches. The firing circuit can not be reclosed at this point until the top carriage returns to battery (within 2.7 inches of its prescribed firing position). The circuit is even then not reclosed automatically, but is to be closed by the *intentional* act of a *cannoneer* after the gun is laid and otherwise ready to fire. Thus the battery commander can not fire the gun before the gun commander has completed the laying, etc., and is ready.

However, as it may be desirable in firing, piece by piece, to obtain the maximum rapidity of action by firing immediately the gun comes into battery, the switch is so arranged that it *may be set* to make contact automatically when the top carriage is in battery. Then the piece can be fired by pressure of one of the firing keys. *This must never be so set, however, for battery fire, as a shot might be lost or someone hurt by the battery commander firing after the gun was in battery but before it was*

properly laid or before all cannoneers were in safe positions. *This setting for automatic action should never be made except by express order.*

The safety firing switch is essentially a double-pole, single-brake, single-throw knife switch, the body carrying the two knife blades being pivoted to the chassis, and the double blades or sockets for the knives to make contact with being fastened to the lug of the top carriage. When the top carriage is in battery the sockets are directly above the knife blades, and if the body is raised by hand until the blades engage in them the circuit will be closed at this point, and the friction on the blades will support the weight of the body and keep the contact made until the top carriage moves to the rear and releases the blades, when the body will swing downward about its pivot on account of its own weight. As long as the top carriage is not in battery it is evident that contact can not be remade since the sockets are not within reach of the knife blades. Even when the top carriage returns to battery there is no tendency of the body to rise against its own weight and make contact, so that it must be lifted by an act of man.

The automatic remaking of contact is secured *when ordered* by raising the support which holds the body always in its upper position, in which case the blades will engage in the sockets as the top carriage comes into battery.

ILLUMINATION.

Incandescent lamps are to be attached to the carriage for the purpose of illuminating all scales and pointers. At this writing the most suitable design of fittings and the most convenient location of these lamps are not yet decided upon, but are being determined by trial.

ELECTRICAL CONDUCTORS.

All electrical conductors for the motor equipment, for the lamps, and for the firing circuits, etc., upon the carriage enter the counterweight well through a duct in the concrete, the opening of which is in the rear wall of the well, a short distance below the base ring. Thence they hang in a flexible cable or bundle, with sufficient slack to permit traversing through the allowed angle and have their ends secured to the racer. Thence the individual conductors are led to the several points at which their current is to be used.





CHAPTER V.

LIST AND NOMENCLATURE OF PARTS OF 5-INCH R. F. GUN AND CARRIAGE.

LIST OF SPARE PARTS FOR ISSUE, ETC.

5-INCH ORDNANCE R. F. GUN, MODEL 1897.

(Price of gun, \$4,550.)

WEIGHTS, DIMENSIONS, ETC., OF GUNS AND AMMUNITION.

Weight, 7,583 pounds.
 Total length, 231.5 inches.
 Length of bore, 225 inches.
 Maximum diameter of breech, 16.5 inches.
 Diameter of muzzle, 8 inches.
 Outside diameter of recoil band:
 Vertical, 27.625 inches.
 Horizontal, 19.250 inches.
 Powder chamber:
 Diameter, 5.50 inches.
 Length, 27.505 inches.
 Capacity, 660 cubic inches.
 Travel of projectiles in bore, 39.099 calibers, 195.495 inches.
 Projectile:

Kind.....	A. P. shot.	A. P. shell.	C. I. shot.	Shrapnel.
Weight (filled).....pounds..	55	55	55	55
Ratio of weight to weight of piece.....	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$
Weight of bursting charge.....pounds..	2.7	3	3.3	3.9
Length.....calibers..	2.7	3	3.3	3.9
Sectional density.....	2.8	2.8	2.8	2.8
Cost ^c	\$18.00	\$10.00	\$8.20	\$6.00

^a Maximite or explosive "D." ^b With fuse. ^c Without fuse or bursting charge. ^d Capped.

Powder:

Kind, smokeless, for 5-inch R. F. gun.
 Weight, 16.40 pounds, smokeless.
 Density of loading, 0.6878, smokeless.
 Muzzle velocity, smokeless, 2,600 feet per second.
 Maximum pressure per square inch, smokeless, 38,000 pounds.
 Terminal velocity:

1,000 yards, smokeless powder, 2,205 feet per second.
 5,000 yards, smokeless powder, 1,127 feet per second.

Muzzle energy, smokeless, 2,577 foot-tons.

Rifling:

Number of grooves, 30.

Width of groove, 0.3736 inch.

Depth of grooves, 0.030 inch.

Width of lands, 0.150 inch.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 9.41 inches from muzzle (being uniform over the 9.41 inches).

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

5-INCH ORDNANCE R. F. GUN.

The designation "one 5-inch Ordnance R. F. gun, model 1897," in correspondence, invoices, receipts, requisitions, etc., comprises the gun proper with its attached parts and breech and firing mechanism complete, as per list below:

List of parts in one breech and firing mechanism complete, for 5-inch Ordnance R. F. gun, model 1897.

Official name of part.	No.	Material.	Location.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock	1	Steel....	In breech of gun	Interchangeable ..	Block.
Threaded sectors ..	4	.....	Formed on breech-block.	.....
Slotted sectors.....	4	.....	do .....	.....
Guide cylinder.....	1	.....	Formed on rear of block.	.....
Guide groove.....	1	.....	Cut in rear of block ..	.....
Stop flange.....	1	.....	Formed on rear of block.	.....
Locking recess ..	1	.....	Cut in surface of guide cylinder.	.....	Locking hole.
Breechblock oil-hole screw.	1	Steel....	Top of block at forward end.	.....
Gear segment	1	do	Attached to rear end of block.	Interchangeable ..	Segment and rack.
Gear segment screws.	1	do	Secure gear segment to block.	.....
Gear segment pallet.	1	do	Permanently attached to top of gear segment.	Interchangeable ..	
Safety stop	1	do	Permanently attached to lower part of gear segment.	do	
Obturator:					
Spindle.....	1	do	Mounted in block	do	Obturator spindle, mushroom spindle; also wrongly called "obturator."
Spindle nut	1	do	On rear end of spindle.	do	Obturator spindle nut, obturator nut.
Spindle nut screw ..	1	do	In spindle nut.....	do	
Spindle pallet	1	do	In stem of spindle.....	do	
Spindle pallet screws.	2	do	Secure spindle pallet.....	do	
Spindle ball washer	1	do	On stem of spindle	do	Obturator washer.
Vent bushing	1	Copper..	Forced in head of spindle.	do	
Exterior split ring (front).	1	Steel....	Seated on rear face of spindle head.	do	Front split ring.
Exterior split ring (rear).	1	do	Seated on front face of filling-in disk.	do	Rear split ring.
Interior split ring ..	1	do	On stem of spindle.....	do	Small split ring, spindle split ring.
Gas check pad.....	1	Asbestos and tal-low covered with canvas.	On spindle	do	Gas check pad.

List of parts in one breech and firing mechanism complete, etc.—Continued.

Official name of part.	No.	Material.	Location.	Remarks.	Synonymous names used in service, shops, etc.
Obturator—Cont'd.					
Filling-in disk.....	1	Steel....	Against front face of breechblock.	Interchangeable ...	Disk.
Block-carrier.....	1	...do....	Formed on front face of carrier.	...do....	Carrier.
Guide flange.....	1	...do....	Cut in front face of carrier.	...do....	
Stop groove.....	1	...do....	On rear face of carrier.	...do....	
Pinion seat.....	1	...do....	Cut in left side of carrier.	...do....	
Latch groove.....	1	...do....	Pivots carrier to breach of gun.	Interchangeable...	
Hinge pin.....	1	Steel....	In lower end of hinge pin.	...do....	
Hinge-pin retaining catch.	1	...do....	Secures catch to hinge pin.	...do....	
Hinge-pin retaining catch screw.	1	...do....	Extends through top of carrier and block into spindle.	...do....	
Spindle key.....	1	...do....	Secures key to carrier.	...do....	
Spindle-key screw.	1	...do....	Seated in left side of carrier.	...do....	Lock bolt.
Latch bolt.....	1	...do....	Pivoted in left side of carrier.	...do....	
Latch lever.....	1	...do....	Between block carrier and lever.	...do....	
Latch-lever spring.	1	...do....	Pivots lever to carrier.	...do....	
Latch-lever pivot...	1	...do....	Fastened to face of breech.	...do....	Locking stud.
Latch-bolt seat screws.	2	...do....	Secure bolt seat to breech.	...do....	
Tripping stud.....	1	...do....	Secure stud to breech.	...do....	
Tripping-stud screws.	2	...do....	Pivoted to carrier.	...do....	Operating lever.
Lever.....	1	...do....	Fitted to end of lever.	...do....	
Pinion.....	1	...do....	Pivots lever and pinion to carrier.	...do....	Lever handle pivot.
Pinion pivot.....	1	...do....	Secures pinion pivot.	Not interchangeable.	Lever handle pivot nut.
Pinion-pivot nut...	1	...do....	Secures nut to pivot.	...do....	Lever handle pivot pin.
Firing attachment, complete:					
Slide housing.....	1	...do....	Attached to rear end of spindle.	Interchangeable ...	Housing.
Extractor slot		...do....	Cut in slide housing.	...do....	
Slide housing firing groove.		...do....	...do....	...do....	
Slide housing guides.		Steel....	...do....	...do....	
Slide housing spline screw.	1	...do....	Secures housing to spindle.	Interchangeable ...	
Slide stop.....	1	...do....	Screwed into right side of slide housing.	...do....	Stop screw.
Slide.....	1	...do....	Slides in slide-housing guides.	...do....	
Slide handle.....	1	...do....	Screwed into top of slide.	Not interchangeable.	
Slide contact plate.	1	Copper.	Fastened to rear face of slide.	Not interchangeable; can be fitted in field.	
Slide contact-plate screws.	2	Steel....	Secure contact plate to slide.	Interchangeable ...	
Slide contact-plate insulation.	1	Vulcanized fiber.	On rear face of slide.	...do....	
Slide contact-plate springs.	2	Spring brass.	Permanently attached to lower end of contact plate.	...do....	
Slide contact-plate spring pin.	1	Steel....	Secures springs to plate.	...do....	
Slide contact pin...	1	Copper.	Seated in left side of slide.	Not interchangeable; can be fitted in field.	
Slide contact-pin insulation.	1	Vulcanized fiber.	Surrounds contact pin.	Not interchangeable.	
Slide-contact pin seat.	1	Steel....	Screwed into left side of slide.	...do....	

List of parts in one breech and firing mechanism complete, etc.—Continued.

Official name of part.	No.	Material.	Location.	Remarks.	Synonymous names used in service, shops, etc.
Firing attachment, complete—Cont'd.					
Extractor.....	1	Steel....	Seated in rear face of housing.	Interchangeable...	Primer ejector.
Extractor roller....	1	do....	Lies in slot in slide....	do.....	Loose-pin roller.
Extractor-roller shutter.	1	do....	Retains roller in slide.	do.....	Roller shutter.
Extractor-roller shutter screw.	1	do....	Pivots shutter to slide.	do.....	Roller-shutter screw.
Firing leaf.....	1	do....	Pivoted to slide.....	do.....	Safety lug.
Firing-leaf safety pin.	1	do....	Formed on firing leaf.	do.....	
Firing-leaf spring..	1	Steel....	On top of slide.....	Interchangeable...	Leaf spring.
Firing-leaf pivot....	1	do....	Pivots leaf to slide....	do.....	
Circuit breaker, complete.					
Circuit - breaker housing.	1	do....	Secured to left side of gear segment.	do.....	
Circuit - breaker housing cap.	1	do....	Screws on end of housing.	do.....	
Circuit - breaker housing screws.	2	do....	Secure housing to segment.	do.....	
Circuit - breaker spring.	1	do....	In circuit - breaker housing.	do.....	
Circuit - breaker contact pin.	1	Brass....	do.....	do.....	
Circuit - breaker contact-pin insulation.	1	Vulcanized fiber.	Surrounds contact pin.	do.....	
Firing cable.....	1	Insulated copper wire.			
Firing-cable thimble.	1	Brass....	Attaches end of cable to contact pin.	Interchangeable...	
Gear-segment firing-cable clamp.	1	do....	Top of gear segment....	do.....	Gear-segment firing-cable support.
Gear-segment firing-cable clamp screws.	2	Steel....	Secure clamp to segment.	do.....	
Block-carrier firing-cable clamp.	1	Brass....	On right side of carrier.	do.....	Block-carrier firing-cable support.
Block-carrier firing-cable clamp screws.	2	Steel....	Secure clamp to carrier.	do.....	

NOTE.—The hinge pins of the breech mechanism of guns of this class and caliber are in the future to be provided with oil groove and screw.

SIGHTS.

The sights for the 5-inch Ordnance R. F. gun, model 1897, are attached to the mount.

The first thirty carriages constructed (barbette carriages on balanced pillar mounts) were provided with open sights and electric night sights. Carriages of this class after No. 32 will be provided with a combination bar sight, combining in itself an open, an electric night, and a telescopic sight; also made to interchange in the sight bracket with the original separate sight. The combination sight will also, in the near future, be applied to the first thirty-two carriages. For a full description of these sights see pamphlet on General Description of the 5-inch Barbette Carriage on Balanced Pillar Mounting, Model 1896, etc., published by the Ordnance Department, U. S. Army.

Each telescopic sight is provided with a sight retainer and band assembled to the sight.

FUSES.

The following fuses are used with projectiles for 5-inch Ordnance R. F. gun:

For shell—High resistance base fuse A, model F. A.

For shell, detonating—High resistance base fuse C, model 1900, F. A.

For shrapnel—High resistance twenty-eight second combination fuse, model 1900, F. A.

For prices see pages 345, 346, 347.

PRIMERS.

The following primers are used for 5-inch Ordnance R. F. gun:

Obturator electric, new model, 1899.

Combination electric and friction, model 1900.

NOTE.—For full description of fuses, etc., see pamphlet on Fuses for Field, Siege, and Seacoast Powder Charged Shell and Shrapnel, published by the Ordnance Department, U. S. Army.

PRESSURE GAUGES.

The fixed crusher gauge for cannon, small, is issued for use with this gun to obtain pressures. For list of nomenclature of parts and list of tools, accessories, etc., see page 371.

CLEANING MATERIAL.

For annual allowance of material for cleaning, preservation, etc., see supply table, pages 359 and 360.

SPARE PARTS FOR GUN.

The following spare parts are issued for 5-inch Ordnance R. F. gun, model 1897:

Name of parts.	Batteries.			Price each.
	1-gun.	2-gun.	3-gun.	
Gas-check pad	1	1	1	\$4.50
Split rings (sets): Front, \$10; rear, \$10; small, \$6	1	1	1	25.00
Firing attachment, complete	1	1	1	150.00
Slide-contact plates, with springs, screws, and insulation, complete	2	4	6	8.27
Slide-housing spline screws	2	4	6	1.10
Slide stop	1	2	3	4.41
Slide-contact pin and insulation	1	2	3	2.20
Slide handle	1	1	1	8.82
Circuit-breaker contact pin and insulation	1	1	1	6.61
Firing leaf	1	2	3	22.06
Firing-leaf spring	1	2	3	4.41
Extractor	1	2	3	18.28
Firing-cable supports, with screws for each battery (set) (gear segment and block-carrier firing-cable support)	1	1	1	2.76
Spindle-ball washer	1	1	1	18.00
Hinge-pin oil-hole screws	2	4	6	.82
Breechblock oil-hole screws	2	4	6	.84

NOTE.—A set of spare parts as enumerated above should always be kept on hand at post. In ordering spare parts always give name of maker, model, and number of gun for which parts are required.

SUBCALIBER TUBES.

One-pounder subcaliber tubes are issued for use with 5-inch Ordnance R. F. guns, model of 1897, one to each post having guns of this caliber mounted. The list of parts of tube and fixtures are as follows:

List of parts of subcaliber tube and fixtures.

- 1 gun.
- 1 expanding screw.
- 1 front adapter.
- 1 muzzle support.

Accessories and spare parts for subcaliber tube.

The following accessories and spare parts are furnished with each subcaliber tube for 5-inch Ordnance R. F. gun, model 1897.

ACCESSORIES.

- 1 hand extractor.
 - 1 hand spike.
 - 1 bristle sponge.
 - 1 sponge rod.
 - 1 locating gauge.
 - 1 adjusting wrench.
 - 1 dismounting pin.
 - 1 clamping screw-driver (for both clamp screws).
 - 1 oil can.
 - 1 breech cover } or cover for entire tube.
 - 1 muzzle cover }
 - 1 vent cleaner.
 - 1 clip extractor.
 - 1 storage chest.
- Spare part:*
- 1 expanding screw.
- Price of subcaliber tube, fixtures, and accessories, \$350 each.

DECAPPING TOOLS.

There are issued to each post, equipped with 5-inch Rapid Fire Gun (Ordnance Department), one set of tools for decapping and cleaning 1-pounder subcaliber ammunition. These sets are termed "Decapping and cleaning sets for 1-pounder subcaliber ammunition," and are composed of the following:

	Price each.
1 decapping spindle	\$
1 decapping anvil	
1 cleaning brush	
Total	\$2.50

5-INCH BARBETTE CARRIAGE, BALANCE PILLAR MOUNT, MODEL 1898.

Weights of the parts of carriage.

No. of piece.	Name of part.	Weight.
		<i>Pounds.</i>
1	Cylinder with bottom and base plate and dust guard.....	10,266
1	Pillar with base ring and traversing internal gear.....	5,835
16	Traversing rollers.....	184
1	Frame, including racer, loading platform, elevating and traversing brackets, gear, worms, and shafts.....	2,710
1	Shield, front, inner, and top.....	3,170
1	Shoulder rest with bolts, etc.....	86
1	Cradle with elevating rack, springs, spring and piston rods, and stuffing box.....	1,900
2	Hand wheels.....	29
2	Battery brackets.....	38
2	Locking pins.....	4
1	Lifting pinion.....	38
2	Ratchet levers.....	48
3	Forks.....	204
3	Chain pulleys.....	244
3	Posts.....	826
1	Separator.....	54
1	Suspension bolt, with springs and nuts.....	175
1	Distance ring.....	117
3	Chains with attachments.....	130
1	Ladder.....	26
1	Recoil band.....	150
2	Racer clips.....	74
1	Implements with box.....	112
	Total carriage.....	26,401
	Counterweight.....	22,408
	Carriage complete with counterweight.....	48,809

Price of carriage complete \$4,166.89.

Names of the parts of carriage, location, material, correct nomenclature, etc.

[Abbreviations for the materials of which the parts are made are as follows: Brass, Bs.; bronze, bz.; cast iron, C. I.; cast steel, C. S.; forged steel, F. S.; nickel steel, N. S.; steel plate, S. P.; German silver, G. S.; lead, Ld.; vulcanized fiber, V. F.; wrought iron, W. I.]

Name of part.	Material.	Number	Diameter or width.	Length or thickness.	Notes	Remarks.
Base ring	C. S., No. 2 ..	1	<i>Ins.</i> 47.7	<i>Ins.</i> 10.25	...	
Base-ring bolts	F. S.	24	1	3.125	24	
Cap squares	C. S., No. 1 ..	2	3.5	4.5		
Cap-square locking pins	S.	2	1	6		Each with chain and eye screw.
Cap-square oil plugs	Bs.	2	.375	.75		
Counter-recoil buffer and stem	Bs., No. 3 ..	1	5.5			
Counter-recoil buffer gasket	V. F.	1	5.5	.06		4.6 inches diameter of hole.
Counter-recoil springs	F. S.	6	4.5	{about 18}		
Counter-recoil springs, pistons, and rods	F. S., No. 2 ..	2	2	71	4	Forged solid; piston 5 inches diameter.
Counter-recoil spring separators	Bs.	8	4.75			Four 2 inches and four 1 inch long.
Counter-weight, bottom layer	C. I.	1	46	18		
Counterweight, intermediate layer	C. I.	1	46	13.5		
Do	Ld.	1	46	10		
Do	Ld.	1	46	11		
Counterweight, top layer	Ld.	21	46	6		Detachable pieces.
Counterweight handles	W. I.	6	.5	7		One cast in each of 6 pieces of top layer.
Do	W. I.	12	.5	4.25		One cast in each of 12 pieces of top layer.
Counterweight spring, outer	F. S.	1	8	{about 14}		
Counterweight spring, inner	F. S.	1	{about 5.5}	{about 14}		
Counterweight staples	W. I.	8	.75	9.5		Two casts in each layer.
Do	W. I.	6	.5	7.5		Two casts in each outer piece, top layer.
Cradle	Bs., No. 3 ..	1	22.5	53.5		
Cradle oil plugs	Bs.	2	.625	1		
Cylinder	C. I., No. 2 ..	1	55.5	10 feet		
Cylinder base plate	C. I., No. 2 ..	1	22.5	6		
Cylinder base-plate bolts	F. S.	8	.75	3.125	8	Countersunk heads.
Cylinder bottom plate	F. S.	1	55.5	1		
Cylinder bottom-plate bolts	F. S.	12	.75	3.5	12	
Cylinder dust guard	Bz.	1	53.5	.25		In halves.
Cylinder dust-guard screws	Bs.	22	.5	1		Countersunk heads.
Elevating bracket	C. S.	1	10.25	29		One 5 x 1.25 pin, Bs., forced in pistol groove.
Elevating bracket bolts	F. S.	2	1	3	3	
Elevating bracket tap bolts	F. S.	8	1	2		
Elevating bracket oil plugs	Bs.	2	.375			
Elevating handwheel	Bs.	1	14	1.25		
Elevating handwheel handle	F. S.	1	.375	4.5		Riveted in rim of handwheel.
Elevating handwheel-handle tube	Bs.	1	1.125	4.25		
Elevating handwheel shaft	F. S.	1	1	3.625		
Elevating handwheel-shaft key	F. S.	1	.31	1.4		Staked in shaft.
Elevating handwheel-shaft bushing	Bs.	1	1.375	1.25		Forced in elevating bracket, top end.
Do	Bs.	1	1.375	2		Forced in shoulder rest.
Elevating handwheel-split pin	F. S.	2	.25			
Elevating miter gears	Bs.	2	3.5	1.25		One pair.
Elevating pinion	F. S.	1	4	1.75		
Elevating pinion shaft	F. S.	1	1.75	1.75	2	Special.
Elevating pinion shaft keys	F. S.	2	.5x.5	7		Staked in shaft.
Elevating pinion shaft bushings	Bs.	1	3	6.5		Forced in elevating bracket.
Do	Bs.	1	3	2.25		Forced in elevating worm-wheel cover.
Elevating pinion shaft washer	Bs.	1	2.5	.375		
Elevation pointer	Bs.	1	4	8.5		
Elevation pointer tap bolts	F. S.	2	.5	1		
Elevation pointer adjustment	Bs.	1	1.625	1.5		
Elevation pointer adjustment tap bolt	F. S.	1	.5	.75		
Elevating rack	Bs., No. 3 ..	1	2.83	17.5		
Elevating rack bolts	F. S.	5	.75	2.25	5	Countersunk heads.
Elevating worm and shaft	F. S.	1	1	13.25		
Elevating worm and shaft bushing	Bz.	2	1.375	2.125		One .25 x .375 Bs. pin driven in each.
Do	Bs.	1	1.375	2.25		

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Material.	Number.	Diameter or width.	Length or thickness.	Nuts.	Remarks.
Elevating worm and shaft key.	F. S.	1	Inch. .31	Inch. 1.25	.....	Staked in shaft.
Elevating worm wheel	Bs., No. 3. . .	1	{ 7.956 P. D.	{ 1.373 face 9.625 overall.	.....
Elevating worm-wheel friction disks.	C. I., No. 1. .	3	6		.....	Inner, center, and outer.
Elevating worm-wheel friction ring.	Bs.	1	6.75	.375	.....	A part of worm wheel.
Elevating worm-wheel friction ring dowels.	Bs.	12	.31	1.75	.....	Driven in worm wheel.
Elevating worm-wheel cover.	C. S.	1	13.5	4	.....
Elevating worm-wheel cover tap bolts.	F. S.	7	.625	2.25	.....
Elevating worm-wheel cover oil plug.	Bs.	1	.375	.75	.....
Elevating worm-wheel cover pipe plug.	Bs.	2	.5	.75	.....
Frame	C. S., No. 1. .	1	34.75	49	.....
Frame tap bolts.	F. S.	16	1	2	.....
Do	F. S.	2	1	3	.....
Lifting pinion	F. S., No. 2. .	1	{ 8.35 O. D.	2.25	.....
Lifting pinion clamp block.	Bs.	1	1.375	2.25	.....
Lifting pinion clamp shoe.	Bs.	1	1.5	.5	.....
Lifting pinion clamp nut.	Bs.	1	2.5	2.85	.....	Keyed in cylinder.
Lifting pinion clamp screw.	F. S.	1	1	.625	.....
Lifting pinion clamp-screw split pin.	F. S.	1	19	1.25	.....
Lifting pinion clamp-screw bushing.	Bs.	1	1.375	2.125	.....
Lifting pinion clamp-screw handle.	F. S.	1	1	7	.....
Lifting pinion shaft	F. S., No. 2. .	1	1.375	25	.....
Lifting pinion shaft bushing.	Bs.	1	2.5	6	.....	Forced in cylinder.
Do	Bs.	1	2	6	.....	Do.
Lifting pinion shaft key.	F. S.	1	{ .437 x .375	2.25	.....	Staked in shaft.
Lifting pinion shaft oil plugs.	Bs.	2	.375	.75	.....
Lifting pinion cover.	Bs.	1	5.5	8	.....
Lifting pinion cover tap bolts.	F. S.	4	.5	.875	.....
Lifting rack.	F. S.	1	7	108.5	.....	Riveted in pillar.
Lifting ratchet levers.	F. S.	2	.....	41.75	.....
Lifting ratchet-lever hub.	F. S.	2	3	2.125	.....
Lifting ratchet-lever hub nut.	F. S.	2	3	.375	.....
Lifting ratchet-lever hub-nut set screw.	F. S.	2	.25	.31	.....
Lifting ratchet-lever pawls.	F. S.	2	.75	2.625	.....
Lifting ratchet-lever pawl pin.	F. S., No. 3. .	2	.625	1.75	.....
Lifting ratchet-lever pawl-pin split pin.	F. S.	2	1.25	.....	.....
Lifting ratchet-lever pawl spring.	F. S.	2	.35	{ about 1.9	.....
Lifting ratchet-lever pawl-spring thimble.	F. S.	2	.5	1.45	.....
Lifting ratchet-lever pawl-spring thimble bushing.	Bs.	2	.625	.169	.....	Forced in lever.
Lifting ratchet wheel.	F. S.	2	3.5	.75	.....
Lifting ratchet-wheel key.	F. S.	2	.5	.75	.....
Name plate	Bs.	1	2.65	4	.....
Name-plate screws.	Bs.	2	.25	.5	.....
Pillar	S. P., No. 1. .	1	50.47	{ 9 ft. 10.5 in.	.....	{ Of plates, angles, etc., riveted together.
Pillar locking pins.	Bs.	2	1	6.75	.....	Each with chain and eye screw attached.
Pillar manhole cover.	S. P.	1	17.25	19.25	.....
Pillar manhole-cover screws.	Bs.	12	.5	1	.....	Countersunk heads.
Platform	F. S.	1	6 feet	{ 7 ft. 10.25 in.	.....	{ Of plates, angles, etc., riveted together.
Platform tap bolts.	F. S.	6	1.125	1.75	.....
Platform studs.	F. S.	2	1.125	2.81	2	
Platform flooring.	Yellow pine.	15	6 feet	{ 4 ft. 6 in.	.....	1.25 x 3 x 71.25 strips.
Platform flooring bolts.	F. S.	30	.375	1.75	30	
Platform ladder.	F. S.	1	11	42.25	.....
Racer	C. S., No. 2. .	1	45	6.5	.....
Racer bushing.	Bs.	1	6.5	4.5	.....
Racer clip, front.	C. S., No. 2. .	1	5.625	60°	.....	Forced in pintle hole.
Racer clip, rear.	C. S., No. 2. .	1	5.625	20°	.....
Racer-clip tap bolts.	F. S.	12	1	2	.....
Racer hand-hole cover.	F. S.	1	4.5	7.5	.....

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Material.	Number.	Diameter or width.	Length or thickness.	Notes.	Remarks.
Racer hand-hole cover tap bolts.	F.S.....	4	<i>Ins.</i> .625	<i>Ins.</i> 1	.....
Recoil band.....	F.S., No. 8..	1	19.25	6	.....
Recoil-band key.....	F.S.....	1	3.289	9	.....
Recoil-band key set screw.....	F.S.....	1	.625	.75	.....
Recoil piston and rod.....	F.S., No. 8..	1	3.75	34.5	2	Forged solid, piston 7 in. diam.
Recoil cylinder, filling and drain plugs.	F.S.....	4	.875	8	.....
Recoil cylinder, filling and drain gaskets.	V.F.....	4	1.875	.06	.....	.875 in. diam. of hole.
Recoil stuffing box.....	Bs., No. 3..	1	8.5	5.4	.....
Recoil stuffing-box gland.....	Bs., No. 3..	1	5.75	4.75	.....
Recoil stuffing-box gasket.....	V.F.....	1	8.5	.06	.....	7.25 diam. of hole.
Recoil stuffing-box packing.....		2	.875	14.5	.....	2 rings, Garlock waterproof hydraulic.
Recoil throttling bars.....	F.S., No. 2..	2	1	15.25	.....
Recoil throttling-bar bolts.....	F.S.....	2	.5	2.06	.....
Do.....	F.S.....	6	.5	2.19	.....
Recoil throttling-bar bolt gaskets.	V.F.....	8	1	.06	.....	.5 in. diam. of hole.
Shield, front.....	N.S.....	1	50.125	74.4	.....
Shield, front, screws.....	F.S.....	14	.875	2.5	.....	Countersunk heads.
Shield, front, hinges.....	C.S., No. 1..	2	4	{about 26}	.....
Shield, front, hinge screws.....	F.S.....	10	.875	2.375	.....	Do.
Shield, inner.....	N.S.....	1	29.5	57.75	.....
Shield, inner, studs.....	F.S.....	8	1	3.125	3	Points threaded 1 inch.
Shield, top.....	N.S.....	1	46.29	76.66	.....	With 3 x 5 x 5 steel angle riveted on.
Shield, top, hinges.....	C.S., No. 1..	2	4	13.75	.....	1 with operating handle cast on
Shield, top, hinge screws.....	F.S.....	10	.875	2.5	.....	Countersunk heads.
Shield, top, hinge tap bolts.....	F.S.....	2	2	4.75	.....
Shield, top, locking pin.....	F.S.....	1	1	{about 5.75}	.....	With chain and eye screw.
Shield, top, arc.....	F.S.....	1	2.5	12	.....
Shield, top, arc pivot.....	C.S., No. 1..	1	3.5	6	1	
Shield, top, arc-pivot screws.....	F.S.....	2	.875	2.375	.....
Shoulder guard.....	Bs.....	1	{about 30.5}	30.5	.....
Shoulder-guard tap bolts.....	F.S.....	9	.625	1.125	.....
Shoulder rest.....	C.S.....	1	12	22.5	.....
Shoulder-rest tap bolts.....	F.S.....	8	1	4.125	.....
Shoulder-rest rubber tube.....	Rubber.....	1	2.5	12	.....
Shoulder-rest rubber-tube nut-strip.....	Bs.....	1	{about 1.5}	12	.....
Shoulder-rest nut-strip tap bolts.....	F.S.....	3	.5	1.5	.....
Shoulder-rest oil plugs.....	Bs.....	2	.375	.....	.....
Suspension chains.....	Bs.....	3	14	{8 ft. 8.5 in.}	.....	{Each with eye shank and special link welded in.
Suspension-chain clevis.....	Bs.....	3	2.5	4.31	.....
Suspension-chain clevis pin.....	Bs.....	3	1	3.25	.....	Each with 2 split pins.
Suspension-chain collars.....	Bs.....	3	2.5	3.375	.....
Suspension-chain collar keys.....	Bs., No. 2..	3	1.375	3	.....
Suspension-chain equalizing yoke.....	C.S., No. 2..	1	12	3.5	.....
Suspension-chain forks.....	C.S., No. 2..	3	6.25	15.5	.....
Suspension-chain fork taper pin.....	F.S.....	3	.5	6.5	.....
Suspension-chain pulleys.....	C.I., No. 1..	3	18.5	6	.....	Each with F.S. axle forced in.
Suspension-chain brackets.....	F.S.....	3	5.25	8.5	.....
Suspension-chain posts.....	F.S., No. 1..	3	3.5	{8 ft. 7 in.}	.....
Suspension-chain separator.....	C.S., No. 2..	1	28	1	.....
Suspension rod.....	F.S., No. 2..	1	2.25	64.25	2	1 nut with spherical under surface.
Traversing rollers.....	F.S., No. 2..	16	4	4.375	.....
Traversing roller bushings.....	Bs.....	32	1.375	1.25	.....	2 forced in each roller.
Traversing roller ring.....	F.S., No. 1..	1	33	3	.....
Traversing roller pins.....	F.S., No. 2..	16	1	6	.....	Driven and riveted in ring.
Traversing internal gear.....	C.S., No. 2..	1	30	4.875	.....
Traversing internal-gear screws.....	F.S.....	8	.75	1.625	.....
Traversing pinion.....	Bs., No. 3..	1	{4.667 O.D.}	2.75	.....
Traversing pinion taper pin.....	F.S.....	1	.25	3	.....
Traversing pinion shaft.....	F.S.....	1	1.81	13	.....
Traversing pinion shaft bushing.....	Bs.....	1	1.75	2	.....	Forced in worm-wheel case.
Do.....	Bs.....	1	2.25	3	.....	Do.

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

Name of part.	Material.	Number.	Diameter or width.	Length or thickness.	Note.	Remarks.
Traversing pinion shaft key.	F. S.	1	1/2 x 5/8	2.5		Staked in shaft.
Traversing pinion shaft oil plug.	Bz.	1	.875			
Traversing pinion shaft collar.	Bz.	1	3	1.125		
Traversing pinion shaft-collar taper pin.	F. S.	1	.25	3.25		
Traversing worm wheel.	Bz., No. 3	1	{ 7.956 } P. D.	1.5		One .25 x .375 Bz. pin driven in. Do.
Traversing worm-wheel case.	C. L., No. 1	1	12.75	9		
Traversing worm-wheel case tap bolts.	F. S.	5	.875	1.625		
Traversing worm cover.	C. L., No. 1	1	5.5	12.75		
Traversing worm-cover tap bolts.	F. S.	8	.625	1.875		
Traversing worm-cover oil plug.	Bz.	1	.875			
Traversing worm-cover pipe plug.	Bz.	3	.5			
Traversing shaft.	F. S.	1	1.25	66.625		
Traversing shaft bushing.	Bz.	1	1.625	2.5		
Do.	Bz.	1	1.625	2.25		
Traversing shaft bearing.	Bz.	1	2.25	4.25		Riveted in handwheel.
Traversing shaft-bearing tap bolts.	F. S.	2	.75	2.875		
Traversing shaft-bearing oil plug.	Bz.	1	.875			
Traversing handwheel.	Bz.	1	16	1.25		
Traversing handwheel handle.	F. S.	1	.875	4.5		
Traversing handwheel-handle tube.	Bz.	1	1.125	4.25		
Traversing handwheel split pin.	F. S.	1	.25			

SIGHTS, OPEN.

Front-sight bead.	F. S.	1	.15	1.45		With G. S. bead riveted on.
Front-sight bead ring.	F. S.	1	2.1	.875		
Front-sight bead-ring taper pin.	F. S.	1	.19	1.125		
Front-sight stem.	Bz.	1	.81	3.875		
Front-sight collar.	Bz.	1	1.125	1.94		
Front-sight bracket.	Bz., No. 1	1	7	10.5		
Front-sight bracket tap bolts.	F. S.	4	.75	1.625		
Front-sight fitting, for electric light.	F. S.	1	.875	.565		
Front-sight fitting taper pin.	F. S.	1	.19	1.125		
Front-sight fitting collar.	Bz.	1	1.125	1.94		G. S. zero mark dovetailed in.
Front-sight fitting stem.	Bz.	1	.81	3.875		
Rear-sight shank and deflection slide.	F. S.	1	4.875	{ about } 16		
Rear-sight deflection window.	F. S.	1	1.875	2.875		
Rear-sight deflection screw.	Bz.	1	.875	5.25		
Rear-sight deflection wheels.	Bz.	2	1.5	.687		
Rear-sight deflection-wheel pins.	F. S.	2	.063	.625		
Rear-sight deflection scale.	G. S.	1	.875	4.875		
Rear-sight deflection-scale screws.	F. S.	4	.156	.5		
Rear-sight ring.	F. S.	1	.7	.25		Combined worm-wheel and spur gear.
Rear-sight spring.	Bz.	1	.87	3.9		
Rear-sight spring screw.	F. S.	1	.219	.3		
Rear-sight elevation scale.	G. S.	1	.44	16		
Rear-sight elevation-scale dowel pin.	F. S.	1	.125	.875		
Rear-sight bracket.	Bz., No. 1	1	7	9.875		
Rear-sight bracket cover.	Bz., No. 1	1	4.5	{ about } 6.5		
Rear-sight bracket-cover screws.	F. S.	4	.219	.44		
Rear-sight bracket tap bolts.	F. S.	4	.75	1.625		
Rear-sight gears.	Bz., No. 1	1	8.7	1.75		
Rear-sight gear shaft.	F. S.	1	.5	3.25	1 Bz.	With G. S. rim shrunk on.
Rear-sight gear taper pin.	F. S.	1	.125	1		
Rear-sight disk, back.	Bz., No. 1	1	2.25	.5		
Rear-sight disk, front.	Bz., No. 1	1	2.25	.81		
Rear-sight drum.	Bz.	1	8.75	.5		
Rear-sight worm and shaft.	F. S.	1	.719	5.25		
Rear-sight shaft bushing.	Bz., No. 1	1	.75	1.625		

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

SIGHTS, OPEN—Continued.

Name of part.	Material.	Number.	Diameter or width.	Length or thickness.	Nuts.	Remarks.
Rear-sight shaft-bushing taper pin.	F.S.	1	Ina. .19	Ina. 1.25	Riveted in wheel.
Rear-sight handwheel.....	Bs.	1	4	1.25	....
Rear-sight handwheel handle	Bs.	1	.625	2	....
Rear-sight handwheel-handle pin.	F.S.	1	.22	2.875	....
Rear-sight handwheel taper pin.	F.S.	1	.004	1	....

SIGHTS—COMBINED BAR AND TELESCOPIC, INTERCHANGING IN BRACKETS WITH OPEN SIGHT.

Sight shank and deflection slide.	F.S.	1	5	{about 16}	Riveted on rear end of bar.
Sight-deflection worm.....	F.S.	1	.5	.5	....
Sight-deflection worm shaft.	Bs.	1	.28	5.75	....
Sight-deflection worm-shaft collar.	Bs.	1	.875	.68	....
Sight-deflection worm-shaft collar pin.	F.S.	1	.08	.5	....
Sight-deflection wheel.....	Bs.	1	1.5	.625	Riveted on front end of bar.
Sight-deflection wheel pin....	F.S.	1	.06	.625	....
Sight-elevation scale.....	G.S.	1	.44	{about 16}	....
Sight-elevation scale pin....	F.S.	1	.125	.875	....
Sight holder.....	Bs.	1	8.5	5.5	....
Sight-holder thumbscrews....	F.S.	2	.81	.875	Staked in.
Sight-holder rivets.....	Bs.	2	.25	1.56	....
Sight-holder stop pin.....	Bs.	1	.125	.81	....
Sight peephole.....	Bs.	1	1.25	3.5	....
Sight bar.....	F.S.	1	1.25	42.25	....
Sight fulcrum.....	F.S.	1	{about 1.81}	3.5	Staked in.
Sight-fulcrum rivets.....	F.S.	2	.25	1.56	....
Sight-fulcrum washer.....	Bs.	1	1	1.25	....
Sight-fulcrum key.....	F.S.	1	.09	.15	....
Sight fitting for electric light.	F.S.	1	{about .875}	2.125	....
Sight-fitting thumbscrew.....	F.S.	1	.19	.5	
Sight bead.....	F.S.	1	.15	1	....
Sight-bead thumbscrew.....	F.S.	1	.19	.5	....
Sight-swivel.....	F.S.	1	1.75	5.12	1	
Sight-swivel key.....	F.S.	1	.25	.5	....
Sight-swivel tap bolt.....	F.S.	1	.5	1.75	
Sight-swivel block.....	Bs.	1	1.5	1.875	....
Sight-swivel block tap bolt...	F.S.	1	.875	1.19	

ELECTRICAL ATTACHMENTS.

1 set night sights, consisting of battery of 10 O. K. dry cells, No. 4, boxed, complete with front and rear electric lights, and plug connections.						
E. L. battery bracket, front....	F.S.	1	6	5.75	....	Counterwunk heads.
E. L. battery bracket, bolts....	F.S.	2	.625	1.75	2	
E. L. battery bracket, rear....	F.S.	1	6	8.31	....
E. L. battery bracket, tap bolts.	F.S.	2	.625	1	....
1 set firing cable, complete with battery, 4 pieces of cable, firing pistol, buzzer, and contact plugs.						
Firing-battery bracket.....	F.S.	1	5.625	9.75	....	On left side of frame. Counterwunk heads.
Firing-battery bracket, bolts..	F.S.	4	.625	1.75	4	
Firing-battery bracket, binding bolts.	F.S.	1	.5	10.3	1	
Stud, for terminal.....	F.S.	1	.25	2	2	
Twisted hook.....	F.S.	1	1.125	2	....
Surface-plug bracket.....	Bs.	1	5.5	6	....
Surface-plug bracket, tap bolts.	F.S.	2	.75	1.75	....

Names of the parts of carriage, location, material, correct nomenclature, etc.—Continued.

ELECTRICAL ATTACHMENTS—Continued.

Name of part.	Material.	Number.	Diameter or width.	Length or thickness.	Nuts.	Remarks.
1 set alternative cable, consisting of battery of 6 O. K. dry cells, No. 4, 8 pieces of cable, firing key, and storage box.						
Firing-battery brackets.....	F. S.....	2	<i>Ins.</i> 5.5	<i>Ins.</i> 9.5	....	On right-hand side of frame. Counterwunk heads.
Firing-battery brackets, bolts.	F. S.....	8	.625	1.75	8	
Firing-battery brackets, binding bolts.	F. S.....	2	.5	10.3	2	
Stud, for terminal.....	F. S.....	1	.25	2	2	

NOTE.—For annual allowance of paints and materials for cleaning and preservation see supply table, page —.

For further details as to care, instruction, etc., see pamphlets issued by Ordnance Department, General Description, etc., of the 5-inch Barbette Carriage on Balanced Pillar Mounting, Model 1896.

SPARE PARTS FOR CARRIAGE.

The following spare parts for 5-inch barbette carriage on balanced pillar mounting, model 1896, are issued to the service:

	Price each.
2 cap-square locking pins with chain and eyebolt	\$1. 00
4 racer hand-hole cover tap bolts	
1 locking pin with chain and eyebolt for top shield	1. 00
6 counter recoil springs with separators	
4 rings, Garlock, waterproof, hydraulic packing	
4 filling and drain plugs	
8 throttling bar bolts with washers	
6 oil-hole plugs, $\frac{1}{4}$ inch diameter .....	. 10
12 oil-hole plugs, $\frac{1}{4}$ inch diameter .....	. 10
6 oil-hole plugs, $\frac{1}{4}$ -inch pipe tap .....	. 10
4 split pins, $\frac{1}{4}$ -inch	
4 split pins, $\frac{1}{4}$ -inch	
1 traversing pinion taper-pin	
1 elevating pointer tap bolt	
2 pillar locking pins with chain and eye screw	
4 lifting pinion cover tap bolts	
3 suspension-chain fork taper pins	
1 set of springs for suspension rods	
3 suspension chains, complete	2. 00
2 lifting ratchet levers, complete	
1 filling funnel	
1 sight, complete, with all fittings (either bar or open)	
1 electric firing cable, complete	18. 00
1 cable for lighting (complete)	6. 00

NOTE.—A complete set of these parts as herein enumerated should always be kept on hand at post where such carriages are part of the armament. In ordering parts of carriage always specify the kind, model, and number of carriage for which parts are required.

CONTENTS OF ARMAMENT CHEST FOR 5-INCH R. F. GUN, MODEL 1897.

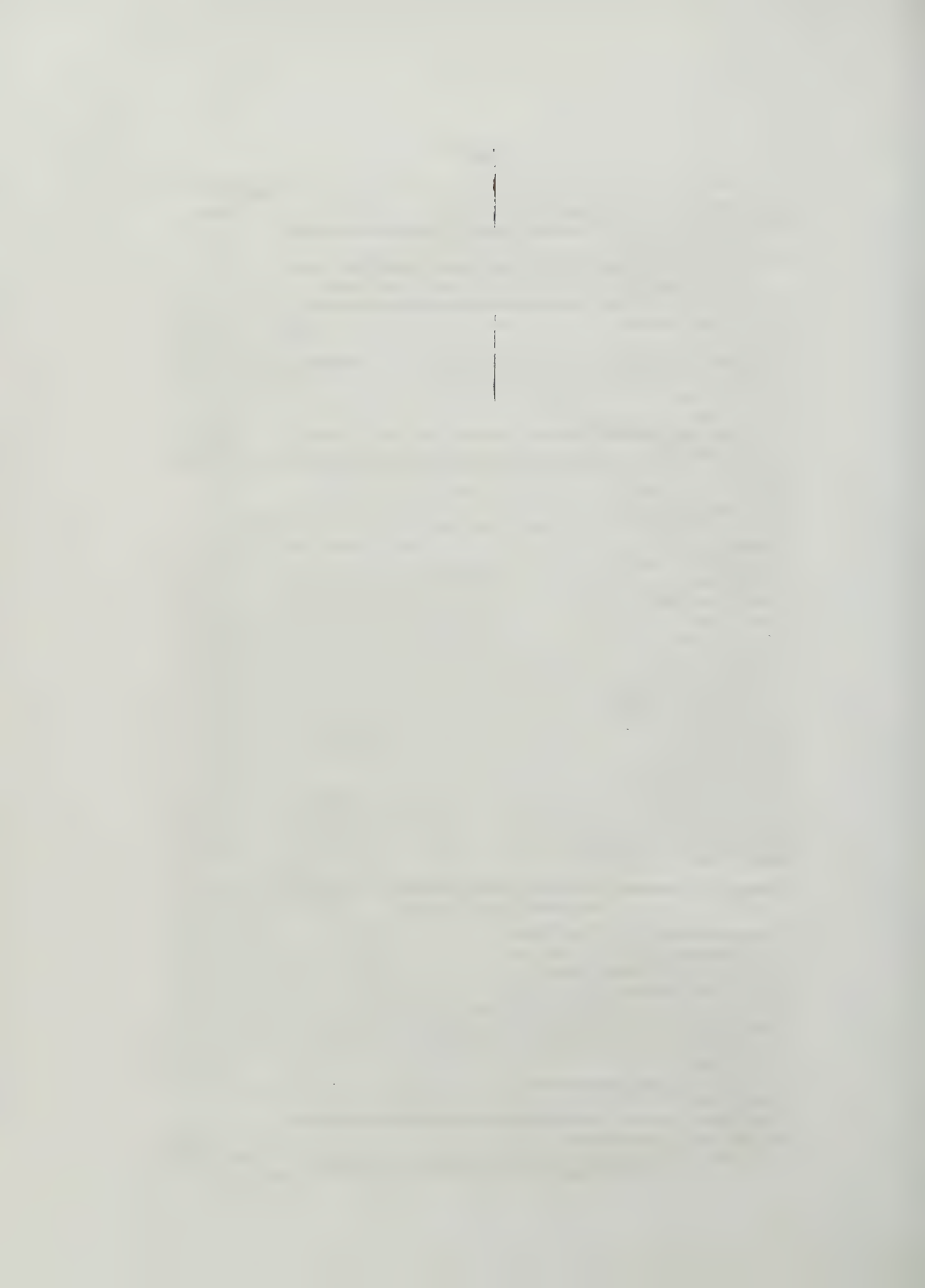
	Price each.
1 armament chest	\$45. 00
1 loading tray	9. 00
1 bar screw-driver for spindle nut, pinion pivot and hinge screws .....	. 75

	Price each.
1 bar screw-driver for latch lever pivot	\$0.75
1 bar screw-driver for circuit breaker housing screws, firing cable chest screw, firing box pivot.....	.75
1 bar screw-driver for spindle key screw, gear segment screw, slide housing spline screw latch bolt set screws, tripping and stud screws....	.75
1 commercial screw-driver for contact plate screws, ejector roller shutter screws, sight screws .....	.40
1 gunner's pouch	2.50
1 pair gunner's sleeves	per pair.. .18
1 gunner's punch.....	.90
1 gunner's reamer	1.00
1 gunner's gimlet.....	.55
1 cleaning reamer for primer seat.....	1.00
1 gunner's lanyard	1.15
1 file, flat, dead smooth.....	.13
1 file, half round, smooth .....	.07
1 file, round, second-cut .....	.08
1 file, three-cornered.....	.13
1 hammer, copper	1.25
1 hammer, boiler maker's.....	.72
1 mallet, hand.....	.18
1 mallet, long-handled .....	.60
1 metal scraper.....	.43
1 oiler, half pint.....	.13
1 pin punch.....	.50
1 pair cutting pliers.....	.60
1 monkey wrench, 15-inch .....	.90
1 monkey wrench, 10-inch .....	.45
1 quire emery cloth, No. 00.....	per quire.. .44
3 wagon sponges.....	per pound.. 2.38
1 bronze drift (large).....	.40
1 bronze drift (small).....	.25
4 balls twine, assorted	per pound.. .15
2 pounds copper wire, No. 12	do..... .20
2 pounds copper wire, No. 16	do..... .20
12 silk wipers, or cotton waste ^a .....	.10

CONTENTS OF IMPLEMENT CHEST FOR 5-INCH BARBETTE CARRIAGE, MODEL 1896, ON
BALANCED PILLAR MOUNTING.

	Price each.
1 double wrench for 2 and 3½ inch nuts	
1 double wrench for 0.75 and 1 inch nuts.....	
1 single wrench for stuffing-box nuts.....	
1 single wrench for suspension-bolt nut	
1 flat steel screw-driver for 0.75 and 0.875 inch screws.....	
1 flat steel screw-driver for 0.5-inch screws	
2 small-handled screw-drivers for sight screws.....	
1 oiler, 1 quart	
2 S hooks for elevating counterweights.....	
1 filling funnel	
The following articles, being too large, are not to be kept in the chest:	
2 water buckets, indurated fiber.....	

^a 10 pounds of cotton waste to be issued in lieu of 12 silk wipers.



CHAPTER VI.

LIST AND NOMENCLATURE OF PARTS OF 6-INCH R. F. GUN AND CARRIAGES.

LIST OF SPARE PARTS FOR ISSUE, ETC.

WEIGHT, DIMENSIONS, ETC., OF 6-INCH ORDNANCE R. F. GUN, MODELS 1897 AND 1897 M1, AND AMMUNITION.

Weight, 16,216 pounds.
 Distance between rimbases, 22 inches.
 Length of trunnions, 5 inches.
 Distance of axis of trunnions from muzzle, 179.7 inches.
 Total length, 277.85 inches.
 Length of bore, 267.45 inches.
 Maximum diameter of breech, 20.95 inches.
 Diameter of muzzle, 9.50 inches.
 Diameter of trunnions, 7 inches.
 Powder chamber:
 Diameter, 7 inches (average).
 Length, 33.375 inches.
 Capacity, 1,278 cubic inches.
 Travel of projectile in bore, 39.0125 calibers, 234.075 inches.
 Projectile:

Kind.....	A. P. shot.	A. P. shell.	C. I. shell.	Shrapnel.
Weight (filled and fused).....	100	100	100	100
Ratio of weight to weight of piece.....	1 ¹¹ / ₁₆	1 ¹¹ / ₁₆	1 ¹¹ / ₁₆	1 ¹¹ / ₁₆
Weight of bursting charge (rifle powder).....		4.3	3.4	1.5
Length, calibers.....	2.8	3.2	3.4	2.8
Sectional density.....				
Cost.....	\$80.00	\$17.00	\$4.90	\$14.00

a Maximite or explosive D. b With fuse. c Without fuse or bursting charge. d Capped.

Powder:

Kind, smokeless, nitrocellulose.
 Weight (not including igniting charge), 29.70.
 Density of loading, 0.6433.
 Muzzle velocity, smokeless, 2,600 feet per second.
 Maximum pressure per square inch, smokeless, 38,000 pounds.
 Terminal velocity:
 1,000 yards range, smokeless, 2,284 feet per second.
 5,000 yards range, smokeless, 1,308 feet per second.
 Muzzle energy, smokeless powder, 4,686 foot-tons.

Rifling:

Number of grooves, 36.
 Width of grooves, 0.3736 inch.
 Depth of grooves, 0.040 inch.
 Width of lands, 0.150 inch.
 Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 23.25 inches from muzzle, being uniform over the 23.25 inches.

The powder chambers of the first fourteen guns of this model have a length of 33.445 inches, width 8.7 inches, with a capacity of 1,278 cubic inches. The rifling of these guns is one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 19.8 inches from muzzle, being uniform over the 19.8 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

Weight, dimensions, etc., of 6-inch R. F. gun, model 1900, and ammunition.

Weight, 19,114 pounds.

Total length, 310.4 inches.

Length of bore, 299.75 inches.

Maximum diameter of breech, 24 inches.

Diameter of muzzle, 10.8 inches.

Outside diameter of recoil band:

Vertical, (?).

Horizontal, (?).

Powder chamber:

Diameter, 8 inches.

Length, 43.425 inches.

Capacity, 2,100 cubic inches.

Travel of projectile in bore, 42.720833 calibers; 256.325 inches.

Projectile:

Kind.....	A. P. shot.	A. P. shell.	C. I. shell.	Shrapnel.
Weight (filled and fused).....	100	100	100	100
Ratio of weight to weight of piece.....	1 $\frac{1}{11}$	1 $\frac{1}{11}$	1 $\frac{1}{11}$	1 $\frac{1}{11}$
Weight of bursting charge (rifle powder).....		4.80	2.4	1.5
Length, calibers.....	2.8	3.2	3.4	2.8
Sectional density.....	8.54	8.54	8.54	8.54
Cost ^c	\$80.00	\$17.00	\$4.98	\$14.00

^a Maximite or explosive D.

^b With fuse.

^c Without fuse or bursting charge.

^d Capped.

Powder:

Kind, smokeless, nitrocellulose.

Weight, 29.70 pounds.

Density of loading, 0.6433.

Muzzle velocity, smokeless powder, 3,000 feet per second.

Maximum pressure per square inch, 38,000 pounds.

Terminal velocity:

1,000 yards, smokeless powder, 2,653 feet per second.

5,000 yards, smokeless powder, 1,540 feet per second.

Muzzle energy, smokeless powder, 6,239 foot-tons.

Rifling:

Number of grooves, 36.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.040 inch.

Width of lands, 0.150 inch.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 16.37 inches from muzzle, being uniform over the 16.37 inches.

POWDER NOTE.—See page 236.

Price of 6-inch R. F. gun, models 1897 and 1897 M1 \$7,115

Price of 6-inch R. F. gun, model 1900 8,705

6-INCH ORDNANCE R. F. GUN, MODELS 1897, 1897 M1, AND 1900.

The designation "One 6-inch Ordnance R. F. gun, model, etc.," in correspondence, invoice, receipts, requisitions, etc., comprises the gun proper with its attached parts and breech and firing mechanism complete, as per list below:

List of parts in one breech and firing mechanism, complete, for 6-inch Ordnance R. F. gun, models 1897, 1897 M1, or 1900.

Official name of part.	No.	Material.	Location.	Remarks.	Synonymous names used in service, shops, etc.
Breechblock, complete:					
Breechblock	1	Steel....	In breech of gun	Interchangeable ...	Block.
Threaded sectors....	4	.....	Formed on breechblock.	.....	.....
Slotted sectors....	4	.....	do .....	.....	.....
Guide cylinder....	1	.....	Formed on rear of block.	.....	.....
Guide groove....	1	.....	Cut in rear of block ...	.....	.....
Stop flange	1	.....	Formed on rear of block.	.....	.....
Locking recess....	1	.....	Cut in surface of guide cylinder.	.....	Locking hole.
Breechblock oil-hole screw.	1	Steel....	Top of block at forward end.	.....	.....
Gear segment	1	do	Attached to rear end of block.	Interchangeable ...	Segment and rack.
Gear-segment screws.	1	do	Secure gear segment to block.	.....	.....
Gear-segment pallet	1	do	Permanently attached to top of gear segment.	Interchangeable ...	.....
Safety stop	1	do	Permanently attached to lower part of gear segment.	do .....	.....
Obturator:					
Spindle	1	do	Mounted in block	do	Obturator spindle, mushroom spindle, also wrongfully called obturator.
Spindle nut	1	do	On rear end of spindle.	do	Obturator spindle nut; obturator nut.
Spindle-nut screw.	1	do	In spindle nut.....	do .....	.....
Spindle pallet	1	do	In stem of spindle.....	do .....	.....
Spindle-pallet screws.	2	do	Secure spindle pallet..	do .....	.....
Spindle-ball washer	1	do	On stem of spindle	do	Obturator washer.
Vent bushing	1	Copper ..	Forced in head of spindle.	do .....	.....
Exterior split ring (front).	1	Steel....	Seated on rear face of spindle head.	do	Front split ring.
Exterior split ring (rear).	1	do	Seated on front face of filling-in disk.	do	Rear split ring.
Interior split ring ..	1	do	On stem of spindle	do	Small split ring; spindle split ring.
Gas-check pad.....	1	Asbestos and tallow covered with canvas.	On spindle	do	Gas check; pad.
Filling-in disk	1	Steel....	Against front face of breechblock.	do	Disk.
Block carrier	1	do	Formed on front face of carrier.	do	Carrier.
Guide flange	1	.....	Cut in front face of carrier.	.....	.....
Stop groove	1	.....	On rear face of carrier.	.....	.....
Pinion seat	1	.....	Cut in left side of carrier.	.....	.....
Latch groove	1	.....	Pivots carrier to breech of gun.	Interchangeable ...	.....
Hinge pin	1	Steel ...			

List of parts in one breech and firing mechanism, complete, etc.—Continued.

Official name of part.	No.	Material.	Location.	Remarks.	Synonymous names used in service, shops, etc.
Extractor—Cont'd.					
Hinge-pin retain- ing catch.	1	Steel ...	In lower end of hinge pin.	Interchangeable ...	
Hinge-pin retain- ing catch screw.	1	...do ...	Secures catch to hinge pin.	...do ...	
Spindle key	1	...do ...	Extends through top of carrier and block into spindle.	...do ...	
Spindle-key screw	1	...do ...	Secures key to carrier.	...do ...	
Latch bolt	1	...do ...	Seated in left side of carrier.	...do ...	Lock bolt.
Latch lever	1	...do ...	Pivoted in left side of carrier.	...do ...	
Latch-lever spring	1	...do ...	Between block carrier and lever.	...do ...	
Latch-lever pivot.	1	...do ...	Pivots lever to carrier.	...do ...	
Latch-bolt seat	1	...do ...	Fastened to face of breech.	...do ...	Locking stud.
Latch-bolt seat screws.	2	...do ...	Secure bolt seat to breech.	...do ...	
Tripping stud	1	...do ...	Fastened to face of breech.	...do ...	
Tripping-stud screws.	2	...do ...	Secure stud to breech.	...do ...	
Lever	1	...do ...	Pivoted to carrier	...do ...	Operating lever.
Pinion	1	...do ...	Fitted to end of lever.	...do ...	
Pinion pivot	1	...do ...	Pivots lever and pinion to carrier.	...do ...	Lever handle pivot.
Pinion-pivot nut	1	...do ...	Secures pinion pivot	Not interchangeable	Lever handle pivot nut.
Pinion-pivot pin	1	...do ...	Secures nut to pivot.	...do ...	Lever handle pivot pin.
Firing attachment, complete:					
Slide housing	1	...do ...	Attached to rear end of spindle.	Interchangeable ...	Housing.
Extractor slot			Cut in slide housing.	...do ...	
Slide-housing fir- ing groove.			...do ...	...do ...	
Slide-housing guide.			...do ...	...do ...	
Slide-housing spine screw.	1	Steel ...	Secures housing to spindle.	Interchangeable ...	
Slide stop	1	...do ...	Secured into right side of slide housing.	...do ...	Stop screw.
Slide	1	...do ...	Slides in slide hous- ing guide.	...do ...	
Slide handle	1	...do ...	Screwed into top of slide.	Not interchangeable	
Slide contact plate	1	Copper	Fastened to rear face of slide.	Not interchange- able; can be fitted in field.	
Slide contact plate screws.	2	Steel ...	Secure contact plate to slide.	Interchangeable ...	
Slide contact plate insulation.	1	Vulcan- ized fi- ber.	On rear face of slide.	...do ...	
Slide contact plate springs.	2	Spring brass.	Permanently attached to lower end of con- tact plate.	...do ...	
Slide contact plate spring pin.	1	Steel ...	Secures springs to plate.	...do ...	
Slide contact pin	1	Copper	Seated in left side of slide.	Not interchange- able; can be fitted in field.	
Slide contact pin insulation.	1	Vulcan- ized fi- ber.	Surrounds contact pin.	Not interchangeable	
Slide contact pin seat.	1	Steel ...	Screwed into left side of slide.	...do ...	
Extractor	1	...do ...	Seated in rear face of housing.	Interchangeable ...	Primer ejector.
Extractor roller	1	...do ...	Lies in slot in slide.	...do ...	Loose pin roller.
Extractor roller shutter.	1	...do ...	Retains roller in slide.	...do ...	Roller shutter.
Extractor roller shutter screw.	1	...do ...	Pivots shutter to slide.	...do ...	Roller shutter screw.
Firing leaf	1	...do ...	Pivoted to slide	...do ...	
Firing leaf safety pin.	1	...do ...	Formed on firing leaf	...do ...	Safety lug.
Firing leaf spring	1	Steel ...	On top of slide	Interchangeable ...	Leaf spring.
Firing leaf pivot	1	...do ...	Pivots leaf to slide	...do ...	

List of parts in one breech and firing mechanism, complete, etc.—Continued.

Official name of part.	No.	Material.	Location.	Remarks.	Synonymous names used in service, shops, etc.
Circuit breaker, complete:					
Circuit breaker housing.	1	Steel ...	Secured to left side of gear segment.	Interchangeable ...	
Circuit breaker housing cap.	1	....do....	Screw on end of housing.	....do....	
Circuit breaker housing screws.	2	....do....	Secure housing to segment.	....do....	
Circuit breaker spring.	1	....do....	In circuit breaker housing.	....do....	
Circuit breaker contact pin.	1	Brass ...	....do....	....do....	
Circuit breaker contact pin insulation.	1	Vulcanized fiber.	Surrounds contact pin.	....do....	
Firing cable.....	1	Insulated copper wire.	....do....	....do....	
Firing cable thimble.	1	Brass ...	Attaches end of cable to contact pin.	....do....	
Gear segment firing cable clamp.	1	....do....	Top of gear segment ..	....do....	Gear segment firing cable support.
Gear segment firing cable clamp screws.	2	Steel....	Secure clamp to segment.	....do....	
Block carrier firing cable clamp.	1	Brass ...	On right side of carrier.	....do....	Block carrier firing cable support.
Block carrier firing cable clamp screws.	2	Steel....	Secure clamp to carrier.	....do....	

NOTE.—All guns of this caliber, model 1900, are without trunnions to be mounted on "pedestal mount carriages," except Nos. 45 and 46, which will be mounted on "disappearing carriages L. F., model 1898."

NOTE.—The hinge pins of the breech mechanism of guns of this class and caliber are in the future to be provided with oil groove and screw.

The thread for the breechblock of the guns of model 1900 is cut in the breech bushing instead of directly in the jacket itself.

The spindle key of the model 1900 acts merely as a stop for limiting the rotation of the breechblock and does not extend into the spindle.

The firing mechanism of the model 1900 guns differs in that the housing is secured to the spindle by a yoke instead of an interrupted screw. The mechanism rotates with the block instead of remaining in a vertical position. The circuit breaker is on the right instead of the left side of the mechanism.

The safety lanyard attachment is provided for each 6-inch R. F. gun mounted on disappearing carriage, making it impossible to fire a gun so mounted by friction when the gun is out of battery or in its loading position, or until the gun has reached to within 3 inches of firing position. The device is attached to the rear face of the elevating band and consists principally of—

- 1 cylindrical housing.
- 1 flanged drum.
- 1 clock spring.
- 1 safety pawl.
- 1 safety pawl pivot.
- 1 cam.
- 2 branches of lanyard (in addition to ordinary firing lanyard).

SIGHTS.

There are furnished with each of the first twenty-nine guns made and mounted on disappearing carriages, model 1898, one telescopic sight, for use either on sight

standard attached to carriage or on trunnion. For full description of telescopic sights, brackets for holding same, etc., see Handbook of Sights for Cannon, 1899.

These carriages will also, in the near future, be fitted with the combination bar sight used for the "pedestal mount," same to be interchangeable in the sight brackets (trunnion) and used in connection with sight standard at present provided for the carriages.

The sights for the "pedestal mount" carriages, model 1900 (on which will be mounted model 1900 guns), will be attached to mount, and are combination bar sights, combining an open, an electric night and a telescopic sight. These sights are the same as those used on the 5-inch barbette carriage on balance pillar mounting, model 1896, and fully described in pamphlet on that carriage issued by the Ordnance Department, U. S. Army.

Each telescopic sight is provided with a sight retainer and band assembled to the sight.

FUSES.

The following fuses are used with projectiles for 6-inch Ordnance R. F. gun:

For shell—High resistance base fuse A, model 1900, F. A.

For shell detonating fuse—High resistance base fuse C, model 1900, F. A.

For shrapnel—High resistance 15-second combination fuse, model 1900, F. A.

PRIMERS.

The following primers are used for 5-inch Ordnance R. F. gun:

Obturator electric primers, new model 1899.

Combination electric and friction primers, model 1900.

NOTE.—For full description of fuses, etc., see pamphlet on Fuses for Field, Siege, and Seacoast Powder-charged Shell and Shrapnel, published by the Ordnance Department, U. S. Army.

PRESSURE GAUGES.

The fixed crusher gauge for cannon, small, is issued for use with this gun to obtain pressures. For list of nomenclature of parts and list of tools, accessories, etc., see page 371.

CLEANING MATERIAL.

For annual allowance of material for cleaning, preservation, etc., see supply table, pages 359 and 360.

SPARE PARTS FOR GUN.

The following spare parts are issued for 6-inch Ordnance R. F. guns, models 1897, 1897 M1, and 1900:

Model 1897 and 1897 M1.

Name of parts.	Batteries.			Price each.
	1-gun.	2-gun.	3-gun.	
Gas-check pad.....	1	1	1	\$4.50
Split rings (sets): Front, \$10; rear, \$10; small, \$5.....	1	1	1	25.00
Firing attachment, complete.....	1	1	1	150.00
Slide contact plates with springs, screws, and insulation, complete.....	2	4	6	8.27
Slide housing spline screws.....	2	4	6	1.10
Slide stop.....	1	2	3	4.41
Slide contact pin and insulation.....	1	2	3	2.20
Slide handle.....	1	1	1	6.82
Circuit-breaker contact pin and insulation.....	1	1	1	6.61
Firing leaf.....	1	2	3	22.05
Firing-leaf spring.....	1	2	3	3.25
Extractor.....	1	2	3	13.28
Firing-cable supports with screws for each battery (set), (gear-segment and block-carrier firing-cable support).....	1	1	1	2.76
Spindle-ball washer.....	1	1	1	15.00
Hinge-pin oil-hole screws.....	2	4	6	.32
Breechblock oil-hole screws.....	2	4	6	.32

Model 1900—Continued.

Name of parts.	Batteries.			Price each
	1-gun.	2-gun.	3-gun.	
Model 1900.				
Gas-check pad	1	1	1	\$4.50
Split rings (sets): (Front, \$10; rear, \$10; small, \$5)	1	1	1	25.00
Firing attachment, complete	1	1	1	160.00
Slide contact rods and insulation	2	4	6	10.47
Slide stop	1	2	3	4.41
Slide contact bracket, screws, and insulation	1	2	3	1.50
Circuit-breaker contact pin and insulation	1	2	3	6.61
Firing leaf	1	2	3	22.05
Firing-leaf spring	1	2	3	6.61
Extractor	1	2	3	12.23
Spindle-ball washer	1	1	1	15.00
Safety bar	1	1	1	12.23
Slide housing yokes	1	1	1	7.70
Slide catch springs	1	1	1	.51
Hinge-pin oil-hole screws	2	4	6	.32
Breachblock oil-hole screws	2	4	6	.32

NOTE.—A set of spare parts as enumerated above should always be kept on hand at post. In ordering spare parts always give the name of maker, model, and number of gun for which parts are required.

SUBCALIBER TUBE.

One-pounder subcaliber tubes are issued for use with 6-inch Ordnance R. F. guns, one to each post having guns of this caliber mounted. The list of parts of tube and fixtures is as follows:

List of parts of subcaliber tube and fixtures.

- 1 gun.
- 1 expanding screw.
- 1 front adapter.
- 1 muzzle support.

Accessories and spare parts for subcaliber tube.

The following accessories and spare parts are furnished with each subcaliber tube for 6-inch Ordnance R. F. gun of model 1897:

- 1 hand extractor.
- 1 handspike.
- 1 bristle sponge.
- 1 sponge rod.
- 1 locating gauge.
- 1 adjusting wrench.
- 1 clamping screwdriver.
- 1 oil can.
- 1 breech cover
- 1 muzzle cover } or cover for entire tube.
- 1 vent cleaner.
- 1 clip extractor.
- 1 dismounting pin.
- 1 storage chest.

Spare part:

- 1 expanding screw.

The following accessories and spare parts are furnished with each subcaliber tube for 6-inch Ordnance R. F. gun of model 1900:

- 1 hand extractor.
- 1 handspike.
- 1 clamping screw-driver.
- 1 oil can.
- 1 bristle sponge.
- 1 sponge rod.
- 1 adjusting wrench.
- 1 breech cover } or cover for entire tube.
- 1 muzzle cover }
- 1 locating gauge.
- 1 vent cleaner.
- 1 clip extractor.
- 1 dismounting pin.
- 1 storage chest.

Spare parts:

- 1 spare clamping wedge.
- 1 spare clamping screw.

Price of subcaliber tube, fixtures and accessories, \$391.

DECAPPING TOOLS.

There are issued to each post, equipped with 6-inch Rapid-Fire Guns (Ordnance Department), one set of tools for decapping and cleaning 1-pounder subcaliber ammunition. These sets are termed "Decapping and cleaning sets for 1-pounder subcaliber ammunition," and are composed of the following:

	Price each.
1 decapping spindle	\$
1 decapping anvil	
1 cleaning brush	
Total	\$2.50

6-INCH DISAPPEARING CARRIAGE, L. F., MODEL 1898.

Weight of the principal parts.

Name.	Weight.
	<i>Pounds.</i>
Base ring	4,810
Racer	3,400
Distance rings, complete	600
Traversing rollers, each	33
Chassis, each	2,980
Transom	845
Set of recoil rollers and frame, one side	208
Top carriage	2,550
Piston rods, each	225
Suspension rods, each	125
Counterweight, bottom plate	1,880
Counterweight, dead weights	19,100
Crosshead	860
Gun levers, each	1,114
Gun-lever axle	428
Sight standard, with mechanism and platform	1,485
Traversing gear standard	102
Elevating rack guides, each	76
Elevating racks, each	125
Elevating arm	520
Elevating band	180
Total weight of carriage	49,190
Two shot trucks, 200 pounds each	400
Seven shot tongs, 10 pounds each	70
Implements	100

Price of carriage, \$5,731.85.

Names of the parts with their location and the material of which they are made.

Name of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Asimuth circle.....	On base ring.....	Brass.....	1	<i>Ins.</i>	<i>Ins.</i>		In 6 sections. With 2 dowel pins, 0.31 inch diameter.
Asimuth pointer.....	On racer.....	Bronze.....	1				
Asimuth-pointer hinge pin.	For hinge.....	Steel.....	1				
Asimuth-pointer index.	Asimuth pointer.....	Bronze.....	1				
Asimuth-pointer lid.	To hinge on racer.....	do.....	1				
Asimuth-pointer lid hinge.	On racer.....	do.....	1				Single L. H. thread, 0.1175 inch lead. Single L. H. thread, 0.1175 inch lead, with collar.
Asimuth-pointer nut.	On azimuth-pointer screw.	do.....	1				
Asimuth-pointer screw.	Asimuth pointer.....	do.....	1				
Asimuth-pointer slide.	do.....	do.....	1				One 2-inch bore and one 1.375- inch bore; twenty-one 0.375-inch steel balls.
Ball thrust bearings.	On worm shaft.....	Steel.....	2				
Base ring.....	On concrete platform.....	Cast iron.....	1				Special, with lead washers. Do.
Bolts (hexagonal head).	Racer clip to racer.....	Wrought iron.....	4	1	4		
Do.....	Dust guard to racer.....	do.....	86	.5	1		
Do.....	Dust-guard joints.....	do.....	16	.6	.625		
Do.....	Traversing gear standard.....	do.....	4	1	2.75		
Do.....	Suspension-rod nuts.....	do.....	8	.6	2		
Do.....	Chassis to racer.....	do.....	86	1	8.25		
Do.....	Equalizing pipe straps.....	do.....	2	.6	1		
Do.....	Throttling bars to recoil cylinders.	do.....	24	.625	3		
Do.....	do.....	do.....	4	.625	2.5		
Do.....	Recoil-buffer brackets to chassis.	do.....	2	1.5	7.4	2	
Do.....	do.....	do.....	4	1.25	7.1	4	
Do.....	Piston-rod brackets to chassis.	do.....	4	1	2.75		
Do.....	Transom to chassis.....	do.....	12	1	2.75		
Do.....	Elevating band.....	do.....	2	1.5	11.75	2	
Do.....	Elevating bracket cover.....	do.....	6	.5	1.5		
Do.....	Elevating worm-wheel bracket to chassis.	do.....	8	1	3		
Do.....	Sight standard to racer.....	do.....	11	1	3		
Do.....	Elevating hand wheel shaft bracket.	do.....	4	.75	2		
Do.....	Elevating maneuver shaft bracket.	do.....	2	.75	1.75		
Do.....	Worm-shaft coupling.....	Steel.....	2	.5	1.3		
Do.....	Sight-standard ladder.....	Wrought iron.....	2	.75	1.5		
Do.....	Emptying coupling.....	do.....	2	.75	2		
Do.....	Throttling valve.....	do.....	2	.75	2		
Do.....	Elevating maneuver gear bracket.	do.....	2	.5	2.5		
Do.....	do.....	do.....	1	.5	1.25		
Do.....	Traversing maneuver gear bracket.	do.....	3	.5	1.25		
Bushing.....	Tripping lever.....	Bronze.....	2				
Do.....	Traversing compound gear.	do.....	1				
Do.....	Left-hand chassis.....	do.....	1				
Do.....	Elevating bracket cover.....	do.....	1				
Do.....	Elevating worm-wheel bracket.	do.....	1				
Do.....	Elevating hand wheel shaft bracket.	do.....	1				
Do.....	Traversing gear standard.....	do.....	2				
Do.....	In lower ends gun levers.....	do.....	2				
Do.....	Upper ends gun levers.....	do.....	2				
Do.....	Right-hand chassis.....	do.....	2				
Do.....	Gun-lever axle bearings.....	do.....	2				

4 halves.
Do.

Names of the parts with their location and the material of which they are made—Continued.

Name of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inch.	Inch.		
Bushing	Recoil roller frames.....	Bronze	56				
Do	Elevating arm, lower end	do.	2				
Do	Sight standard	do.	2				
Chassis	On racer	Cast iron	2				Right and left sides.
Counterweights	Suspended from cross-head.....	Cast lead	16				Top group.
Do	do.	do.	4				Second layer.
Do	do.	do.	1				Third layer.
Do	do.	do.	4				Fourth to seventh layer, inclusive.
Counterweight bottom plate.....	do.	Cast iron and cast lead.....	1				
Counterweight handles.....	In detachable pieces.....	Wrought iron.....	16				
Counterweight hooks.....	With carriage.....	Steel.....	2				
Crosshead	Connecting counterweight to gun levers.....	Cast steel	1				
Crosshead liners.....	In crosshead	Tobin bronze.....	12				
Direction plate.....	On traversing gear standard.....	Bronze	1				For clutch.
Direction plate for retraction.....	On side of right chassis	do.	1				
Direction plate for traversing.....	On traversing gear standard.....	do.	1				
Direction plates for elevation.....	On elevating handwheel.....	do.	2				
Distance ring.....	At traversing rollers, inner ends.....	Wrought iron.....	1				
Do	At traversing rollers, outer ends.....	do.	1				
Dust guard	For traversing rollers.....	Steel plate.....	1				
Dust guards	On sight standard.....	do.	2				
Elevating arm	Connecting elevating band to elevating racks.....	Cast steel	1				
Elevating-arm boxes.....	Upper end of elevating arm.....	Bronze	2				
Elevating band.....	On breech of gun.....	Cast steel.....	1				
Elevating band set screws.....	Elevating band trunnions.....	Steel.....	2				
Elevating bevel gear	On elevating handwheel shaft.....	Bronze	1				45 teeth, 6 pitch.
Do	On elevating worm shaft.....	do.	1				26 teeth, 4 pitch.
Elevating bevel pinion.....	On maneuver elevating shaft.....	Steel.....	1				15 teeth, 6 pitch.
Do	On elevating handwheel shaft.....	Bronze	1				20 teeth, 4 pitch.
Elevating bracket cover.....	On worm-wheel bracket.....	Cast iron	1				
Elevating clutch	On elevating handwheel shaft.....	Bronze	1				
Elevating clutch handle.....	Clutch-handle stud	Steel.....	1				
Elevating clutch-handle stud.....	On elevating handwheel shaft bracket.....	do.	1			1	
Elevating graduation strips.....	Around elevation dial.....	Brass	1				
Elevating hand-wheel.....	On elevating handwheel shaft.....	Wrought and cast iron.....	1				
Elevating hand-wheel shaft.....	Elevating hand wheel shaft bracket.....	Steel.....	1		14.875		
Elevating hand-wheel shaft bracket.....	On sight standard	Cast iron	1				
Elevating maneuver bevel gear	On maneuver elevating shaft.....	Bronze	1				52 teeth, 3 pitch.
Do	On elevating maneuver shaft.....	do.	1				32 teeth, 8 pitch, with pin.
Elevating maneuver bevel pinion.....	On elevating maneuver hand wheel shaft.....	Steel.....	1				15 teeth, 8 pitch, with pin.
Elevating maneuver bevel pinion and shaft.....	Elevating maneuver gear bracket.....	do.	1		8.75		18 teeth, 8 pitch, with loose ring, pin, and key.
Elevating maneuver gear bracket.....	On sight standard	Bronze	1				
Elevating maneuver gear cover.....	do.	do.	1				

Names of the parts with their location and the material of which they are made—Continued.

Name of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Elevating maneuver handwheel shaft.	Elevating maneuver gear bracket.	Steel	1	Inch.	67.06	.....	With key.
Elevating maneuver shaft bracket.	On sight standard	Cast iron	1	.....	.....	.....
Elevating pinions..	On elevating pinion shaft	Bronze	2	.....	.....	.....	19 teeth, 1 $\frac{1}{2}$ 25 circular pitch.
Elevating pinion shaft.	Through chassis	Forged steel...	1	.....	70.5	.....	With keys.
Elevating racks	On guides on chassis.....	Cast steel	2	.....	.....	.....	1 right hand, 1 left hand.
Elevating rack buffers.	Below elevating racks...	Wrought iron..	2	.....	.....	2	2 steel washers.
Elevating rack buffer springs.	Elevating rack buffer....	Steel	2	.....	.....	.....
Elevating rack buffer-spring bolts.	.....do.....	Wrought iron..	2	.75	.....	4	
Elevating rack guides.	Bolted to chassis.....	Bronze	2	.....	.....	.....
Elevating rack stops	On inside of chassis.....	Steel	2	.....	.....	.....
Elevating thrust nut bearing.	Worm-wheel bracket	Bronze	1	.....	.....	.....
Elevating worm....	On worm shaft.....	Steel	1	.....	.....	.....	1.25-inch lead, double left-hand threads.
Elevating worm shaft.	Worm-wheel bracket .....	.....do	1	.....	42.75	.....
Elevating worm-shaft coupling.	Connect worm shaft with sight-operating worm.	.....do	1	.....	.....	.....
Elevating worm spring.	On worm shaft.....	Spring steel ...	1	.....	.....	.....
Elevating worm washer.	.....do.....	Steel	1	.....	.....	.....	Between worm and spring.
Elevating worm wheel.	On elevating pinion shaft	Bronze	1	.....	.....	.....	38 teeth.
Elevating worm-wheel bracket.	On left chassis	Cast steel	1	.....	.....	.....
Elevation disk	On left end of elevating pinion shaft.	Cast iron	1	.....	.....	.....
Elevation pointer ..	On worm-wheel bracket at elevation disk.	Brass	1	.....	.....	.....
Emptying coupling.	Top carriage	Bronze	1	.....	.....	.....
Emptying followers.	Emptying coupling .....	.....do	3	.....	.....	.....
Emptying plug.....	.....do	Steel	1	.....	.....	.....
Equalizing pipe	On top carriage connecting recoil cylinders.	Copper	1	.....	.....	.....	In five parts.
Equalizing pipe collars.	On ends of equalizing pipe.	Brass	10	.....	.....	.....	Brased on pipe.
Equalizing pipe followers.	Connecting equalizing and throttling pipes to recoil cylinders.	Bronze	4	.....	.....	.....
Equalizing pipe rings.	On ends of equalizing pipe.	Steel	10	.....	.....	.....	Free.
Equalizing pipe straps.	Securing equalizing pipe to top carriage.	Wrought iron..	2	.....	.....	.....
Extractor	For gun-lever and suspension-rod pins.	Steel	1	.....	.....	.....
Extractors.....	For cylinder head .....	.....do	2	.....	.....	.....
Filling plugs	On top of recoil cylinders.	Bronze	12	.....	.....	.....	6 in reserve.
Gun levers	Carrying gun	Cast steel	2	.....	.....	.....	1 right, 1 left.
Gun-lever axle	Uniting gun levers.....	Forged steel ..	1	.....	.....	.....
Gun-lever caps	At upper ends of gun levers.	Cast steel	2	.....	.....	.....
Gun-lever pins	Crosshead to gun levers.	Forged steel ...	2	.....	7.95	.....
Gun-lever pin covers.	On crosshead	Cast iron	2	.....	.....	.....
Leveling screws....	In base ring for leveling.	Bronze	12	1.5	2.5	.....
Leveling thrust plates.	Under base ring, for leveling screws.	Steel	12	.....	.....	.....
Maneuver hand-wheels.	On elevating maneuver shaft and traversing maneuver gear.	Bronze	2	.....	.....	.....	Handles with brass sleeves.
Name plate.....	On right chassis .....	.....do	1	.....	.....	.....
Oil cans	With carriage.....	Brass	2	.....	.....	.....	$\frac{1}{2}$ pint.
Oil can, with valve.	.....do.....	.....do	1	.....	.....	.....	1 quart.
Padlock	Throttling valve.....	Bronze	1	.....	.....	.....	Yale standard padlock, No. 863.
Pawls	Front of chassis for cross-head.	Forged steel...	2	.....	.....	.....

Names of the parts with their location and the material of which they are made—Continued.

Name of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inch.	Inch.		
Pawl fulcrums	Chassis	Forged steel	2	.....	.....	2	1.25-inch nuts.
Pawl springs	Pawl to spring pivot	Spring steel	2	.....	.....	.....	.....
Pawl-spring pivots	Front end of both chassis	Steel	2	.....	.....	.....	.....
Finch bars	With carriage	do	2	.....	45	.....	.....
Finch-bar hook	On right and left chassis	do	4	.....	.....	.....	.....
Pistol bracket	On sight standard	Bronze	1	.....	.....	.....	.....
Pistons and rods	In recoil cylinders	Forged steel	2	.....	119.25	.....	.....
Piston liners	Pistons	Bronze	8	.....	.....	.....	.....
Piston-liner pins	In piston liners	Steel	16	.25	1	.....	1 right, 1 left.
Piston-rod brackets	On top of chassis	Cast steel	2	.....	.....	.....	.....
Racer	On traversing rollers	do	1	.....	.....	.....	.....
Racer clips	On racer	do	2	.....	.....	.....	.....
Recoil-buffer brackets	On chassis	do	2	.....	.....	.....	.....
Recoil-buffer caps	Recoil buffers	do	2	.....	.....	.....	.....
Recoil-buffer cap bolts	do	Steel	4	.75	10.75	4	With split pins.
Recoil-buffer cushions	do	Balata	12	.....	.....	.....	.....
Recoil-buffer plates	do	Wrought iron	10	.....	.....	.....	.....
Recoil rollers	On top of chassis	Forged steel	28	.....	.....	.....	74teeth, 4pitch.
Retraction compound gear	On retraction compound-gear stud	Cast steel	1	.....	.....	.....	.....
Retraction compound-gear stud	Right chassis	Forged steel	1	.....	.....	2	With washer and pin.
Retraction compound pinion	On retraction compound-gear stud	do	1	.....	.....	.....	.....
Retraction crank	On retraction pinion shaft	do	1	.....	.....	.....	Handle with brass sleeve.
Retraction drums	On retraction shaft	Cast iron	2	.....	.....	.....	With set screws and 0.5 square keys.
Retraction ratchet	On retraction pinion shaft	Steel	1	.....	.....	.....	.....
Retraction hooks	On gun-lever cap	Forged steel	2	.....	.....	.....	1 right, 1 left.
Retraction pinion	On retraction pinion shaft	do	1	.....	.....	.....	24teeth, 4pitch.
Retraction pinion shaft	Right chassis	do	1	.....	13.66	1	With washer, pin, and key.
Retraction ratchet-wheel pawl	On pawl pin	Steel	1	.....	.....	.....	.....
Retraction ratchet-wheel pawl pin	Right chassis	do	1	.....	9.45	1	With washer and pin.
Retraction rope	From gun levers to retraction drums	Manila rope	3	.....	.....	.....	.....
Retraction rope sheave	On recoil buffer	Cast iron	2	.....	.....	.....	.....
Retraction rope sheave axle	Recoil-buffer bracket	Steel	2	.....	7.25	.....	Each with washer and split pin.
Retraction shaft	Through chassis	Forged steel	1	.....	48.5	.....	With keys.
Retraction spur gear	On retraction shaft	Cast steel	1	.....	.....	.....	53teeth, 3pitch.
Roller bearing	Elevating maneuver shaft bracket	Steel and bronze	1	1.25	2	.....	Diameter of shaft is given.
Do	Elevating handwheel shaft in sight standard	do	1	1.25	2	.....	Do.
Do	Elevating worm-wheel shaft in sight standard	do	1	1.75	3.5	.....	Do.
Do	Elevating pinion shaft in right chassis	do	1	2.25	4.25	.....	Do.
Do	Elevating pinion shaft in left chassis	do	1	2.75	4.25	.....	Do.
Do	Elevating worm-wheel bracket	do	1	2.75	4.25	.....	Do.
Do	Retraction rope sheaves	do	2	1.25	3	.....	Do.
Do	Retraction shaft in left chassis	do	1	1.75	3.25	.....	Do.
Do	Retraction compound-gear stud	do	1	1.75	5	.....	Do.
Do	Retraction shaft in right chassis	do	1	2	3.25	.....	Do.
Do	Traversing clutch shaft in racer	do	1	1	2	.....	Do.
Do	Maneuver traversing shaft in sight standard	do	1	1.25	2	.....	Do.
Do	Traversing gear standard	do	1	1.5	2.5	.....	Do.
Do	Traversing pinion shaft in racer	do	2	2	3	.....	Do.

Names of the parts with their location and the material of which they are made—Continued.

Name of parts.	Location.	Material.	Number.	Diameter.		Length.	Notes.	Remarks.
				Inch.	Inch.			
Roller-bearing dust guard.	On right chassis.....	Steel and felt..	1					2.3 bore.
Do.....	Retraction shaft.....do.....	do.....	1					1.8 bore.
Roller-frame end pieces.	At ends of roller frame..	Forged steel...	4					
Roller-frame pins...	Through end pieces.....	Steel.....	4	.75	6			
Roller-frame side pieces.	Embracing recoil rollers.	Forged steel..	4					
Roller-frame stays..	Between sides of roller frame.	Steel.....	26		6			
Rope fasteners.....	On retraction drum.....	Steel.....	2				4	
Safety-latch dogs...	On crosshead.....	Forged steel..	2					1 right, 1 left.
Safety-latch fulcrums.	Chassis.....	do.....	2					
Safety-latch springs.	Safety latch to spring pivot.	Spring steel...	2					
Safety-latch spring pivots.	Front ends of both chassis.	Steel.....	2		2.4			
Safety-latch stops...	do.....	do.....	2					
Screw-drivers.....	With carriage.....	do.....	4					2 with wood handle.
Screws, cheese head.	Training rack.....	Wrought iron..	42	.5	1.2			
Do.....	Gun-lever pin covers.....	do.....	4	.5	.8			
Do.....	Suspension-rod pin covers.	do.....	4	.5	.8			
Do.....	Elevating guides.....	do.....	18	.75	2.35			Body fit.
Do.....	Elevating rack stops.....	do.....	2	1.25	1.5			
Do.....	Pistol stop.....	do.....	1	.875				
Do.....	Azimuth pointer.....	Brass.....	2	.5	1.4			
Screws, countersunk	Roller-bearing dust guard	Wrought iron..	6	.875	1.15			
Do.....	do.....	do.....	3	.25	.5			
Do.....	Safety-latch stop.....	do.....	4	.5	1.1			
Do.....	Distance-ring separators.	do.....	20	1	2.35			
Do.....	Oil holes in racer.....	do.....	4	.625	.9			
Do.....	Azimuth pointer, lid hinge.	Brass.....	3	.5	1.25			
Do.....	Azimuth circle.....	do.....	42	.25	.6			
Do.....	Gun lever bushings.....	do.....	16	.875	1.25			
Do.....	Crosshead liners.....	do.....	8	.5	1.1			
Do.....	do.....	do.....	16	.875	.87			
Do.....	Safety-latch dogs.....	Wrought iron..	6	.5	1.5			
Do.....	Retraction hooks.....	do.....	2	.625	1.5			
Do.....	Trunnion bed bushings.	Brass.....	16	.75	1.25			
Do.....	Roller-bearing dust guard	Wrought iron..	3	.25	.4			
Do.....	Graduation strip.....	Brass.....	10	.25	.4			
Do.....	Elevating worm-wheel bracket.	Wrought iron..	3	.25	2.25			
Do.....	Sight standard platform.	do.....	4	.75	1.5			
Do.....	Sight standard ladder..	do.....	2	.75	1.8		2	
Do.....	Traversing direction plate.	Brass.....	2	.25	.6			
Do.....	Elevating direction plates.	do.....	6	.25	.6			
Do.....	Retraction direction plate.	do.....	2	.25	.6			
Do.....	Index.....	do.....	1	.25	.65			
Do.....	Pistol bracket.....	do.....	2	.5	1.25			
Do.....	Traversing gear cover.....	do.....	4	.25	.65			
Do.....	Elevating maneuver-gear cover.	do.....	2	.875	1			
Screws, headless....	Retraction spur gear.....	Wrought iron..	1	.5	.75			
Do.....	Tripping shaft lever.....	do.....	2	.25	.4			
Do.....	Traversing bevel gear.....	do.....	1	.5	.75			
Do.....	Traversing gear.....	do.....	1	.75	.75			
Do.....	Gun-lever pins.....	do.....	2	.5	.75			
Do.....	Suspension rod pins.....	do.....	2	.5	.75			
Do.....	Roller frame.....	do.....	68	.875	.7			
Do.....	Elevating handwheel.....	do.....	1	.5	.75			
Do.....	Elevating bevel pinion..	do.....	1	.5	.75			
Do.....	Elevation disk.....	do.....	1	.5	.75			
Do.....	Maneuver elevating handwheel.	do.....	1	.25	.5			
Do.....	Throttling-valve stem.....	do.....	1	.875	.9			
Do.....	Traversing maneuver spur gear.	do.....	1	.25	.5			
Screws, headless, set	Retraction drum.....	Steel.....	2	.5	1.25			
Do.....	Crank-shaft collar.....	do.....	1	.5	.6			
Do.....	Traversing maneuver shaft pinion.	do.....	1	.875	.45			
Do.....	Elevating bevel pinion..	do.....	1	.875	.5			

Names of the parts with their location and the material of which they are made—Continued.

Name of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Screws, headless, set	Elevating worm-shaft collar.	Steel.....	1	<i>Ins.</i> .5	<i>Ins.</i> .75	...	
Do.....	Maneuver traversing shaft collar.	.....do.....	1	.375	.75	...	
Do.....	Maneuver elevating shaft collar.	.....do.....	1	.375	.75	...	
Do.....	Traversing maneuver gear-shaft collar.	.....do.....	1	.25	.4	...	
Screws, round head.	Elevation pointer.....	Brass.....	2	.375	.8	...	Special.
Do.....	Ball thrust bearings.....	Steel.....	6	...	...	...
Do.....	Dust guard.....	Brass.....	6	.25	.5	...	
Do.....	Core-hole cover.....	.....do.....	6	.25	.5	...	
Do.....	Dust guard.....	.....do.....	4	.25	.5	...	
Do.....	Sight-standard cover.....	.....do.....	3	.25	.5	...	
Do.....	Name plate.....	.....do.....	2	.25	.5	...	
Screws, round head.	Traversing handwheel stud.	Wrought iron..	1	.25	.8	...	
Separators.....	Between-distance rings.	Cast iron.....	10	...	...	...
Shot tongs.....	With carriage.....	Steel.....	7	...	...	...
Sight-connecting rod.	Inside of sight standard.	.....do.....	1	...	...	...
Sight horizontal arm.	.....do.....	Bronze.....	1	...	...	...
Sight horizontal arm pin.	Arm and parallel rod.....	.....do.....	1	.75	3.95	...	With split pin.
Sight-operating segment.	Inside of sight standard.	.....do.....	1	...	...	...	470 teeth in full gear, 0.125" circ. pitch.
Sight-operating segment pins.	On segment and sight bracket.	.....do.....	2	.75	2.75	...	With split pins.
Sight-operating worm.	Sight standard.....	Steel.....	1	...	...	...
Sight-parallel rod..	Inside of sight standard.	Steel and wrought-iron pipe.	1	...	58.97	...	Center to center.
Sight standard.....	On racer.....	Cast iron.....	1	...	...	...
Sight-standard core-hole covers.	On sight standard.....	Steel.....	2	...	...	...
Sight-standard cover.	.....do.....	.....do.....	1	...	...	...
Sight-standard ladder.	On racer.....	Wrought iron..	1	...	...	...
Sight-standard pin.	Segment-arm bracket to sight standard.	Bronze.....	3	...	7.45	3	
Sight-standard platform.	On sight standard.....	Roller iron....	1	...	...	...
Sight-standard platform guard rail.	On sight-standard platform.	Wrought iron..	1	...	...	8	1-inch pipe.
Stops.....	In basing ring to limit traversing of carriage.	Steel.....	2	...	...	...
Studs.....	Rope fasteners.....	Wrought iron..	8	.5	2.75	8	
Do.....	Gun-lever caps.....	.....do.....	2	1.25	6	4	{ 2 nuts 1.25 inches high.
Do.....	.....do.....	.....do.....	2	1.25	6.6	4	
Do.....	Cap squares.....	.....do.....	4	1.25	6.6	4	{ 2 nuts 0.625 inch high.
Do.....	Rear stuffing boxes.....	.....do.....	20	.75	3	20	
Do.....	Elevating arm caps.....	.....do.....	4	.875	4.8	8	
Stuffing boxes.....	Front ends of recoil cylinders.	Bronze.....	2	...	...	...
Stuffing-box followers.	Stuffing boxes at rear and front of cylinders.	.....do.....	4	...	...	...
Stuffing-box glands.	.....do.....	.....do.....	4	...	...	...	8 halves.
Stuffing-box heads..	Rear ends of recoil cylinders.	.....do.....	2	...	...	...
Suspension rods.....	Crossheads.....	Steel.....	2	...	...	...	4 halves.
Suspension-rod nuts	Suspension rod.....	Forged steel..	2	...	...	...
Suspension-rod pins	Crosshead to suspension rods.	.....do.....	2	...	7.95	...	
Suspension-rod pin covers.	On crosshead.....	Cast iron.....	2	...	...	...
Telescopic sight bracket.	On sight standard.....	Bronze.....	1	...	...	...
Telescopic sight-adjusting screws.	On sight bracket.....	.....do.....	2	.375	...	...	With knurled head.
Telescopic sight clamps.	.....do.....	Steel.....	2	...	...	...	Japanned.

Names of the parts with their location and the material of which they are made—Continued.

Name of parts.	Location.	Material.	Number.	Diameter.	Length.	Notes.	Remarks.
Telescopic sight clamp screws.	On sight bracket.....	Bronze	2	<i>Ins.</i> .25	<i>Ins.</i>		
Telescopic sight looking screws.	.....do.....	.....do.....	2	.375			With knurled head.
Throttling bars....	In recoil cylinders.....	Forged steel...	4				
Throttling valve and stem.	Throttling valve.....	Bronze and steel.	1				
Throttling-valve body.	Top carriage.....	.....do.....	1				
Throttling-valve followers.	Throttling valve.....	Bronze	3				1 with 2-inch tap, 2 with 1.625-inch tap.
Throttling-valve gland.	.....do.....	.....do.....	1				
Throttling-valve latch.	.....do.....	.....do.....	1				
Throttling-valve seat.	.....do.....	Steel.....	1				
Throttling-valve yoke.	.....do.....	Bronze	1				
Top carriage	On chassis	Cast iron	1				
Training rack	Attached to base ring.....	Steel.....	1				234 teeth, 3 pitch, in 6 pieces.
Transom	Between chassis	Cast steel	1				
Traversing bevel gear.	Maneuver traversing shaft.	Bronze	1				25 teeth, 6 pitch.
Do.....	On clutch shaft.....	.....do.....	1				22 teeth, 5 pitch.
Traversing bevel pinion.	Traversing maneuver gear shaft.	Steel.....	1				15 teeth, 6 pitch.
Do.....	On traversing crank shaft.	Bronze	1				20 teeth, 5 pitch.
Traversing clutch ..	On clutch shaft.....	.....do.....	1				
Traversing clutch eccentric.	Clutch nut.....	Steel.....	1				
Traversing clutch handle.	On clutch eccentric.....	.....do.....	1				
Traversing clutch nut.	Traversing gear standard	Bronze	1				
Traversing clutch shaft.	.....do.....	Steel.....	1		19.2		
Traversing clutch spring.	On clutch nut.....	.....do.....	1				
Traversing compound gear.	On clutch shaft.....	Cast iron	1				42 teeth, 5 pitch.
Traversing compound pinion.	.....do.....	Steel.....	1				12 teeth, 4 pitch.
Traversing crank...	On traversing crank shaft	.....do.....	1				Handle with brass sleeve.
Traversing crank shaft.	Traversing gear standard	.....do.....	1		14.9		With collar and key.
Traversing gear	On traversing pinion.....	Cast iron	1				52 teeth, 4 pitch.
Traversing bevel gear cover.	Traversing gear standard	Bronze	1				
Traversing spur gear cover.	Racer .....	.....do.....	1				
Traversing gear standard.	On racer	Cast iron	1				
Traversing maneuver gear bracket.	On sight standard	Bronze	1				
Traversing maneuver gear shaft.	Traversing maneuver gear bracket.	Steel.....	1		87.05		With collar and keys.
Traversing maneuver handwheel gear.	Traversing maneuver handwheel stud.	Bronze	1				44 teeth, 8 pitch.
Traversing maneuver handwheel stud.	On sight standard	Steel.....	1		4.76		With washer, screw, and pin.
Traversing maneuver shaft pinion.	On maneuver traversing shaft.	.....do.....	1				12 teeth, 5 pitch.
Traversing maneuver spur gear.	Traversing maneuver gear shaft.	Bronze	1				30 teeth, 8 pitch.
Traversing pinion ..	Racer	Steel.....	1				12 teeth, 3 pitch.
Traversing rollers ..	Between base ring and racer.	Forged steel...	30				
Tripping arms	On tripping shaft .....	.....do.....	2				1 right-hand, bore 1.65; 1 left-hand, bore 1.66.

Names of the parts with their location and the material of which they are made—Continued.

Names of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inch.	Inch.		
Tripping levers.....	On tripping-lever fulcrum	Cast steel.....	2				
Tripping-lever fulcrums.	Chassis.....	Forged steel.....	2				
Tripping-lever stops	Rear ends of chassis.....	Steel.....	4		4.875		Complete.
Tripping rods.....	Outside of both chassis connecting tripping levers.	Forged steel.....	2				
Tripping-rod pins..	Tripping rod to levers ..	Bronze.....	4	.75	2.15		With split pin.
Tripping safety latches.	On safety-latch fulcrum ..	Forged steel.....	2				
Tripping shaft.....	At front end of chassis...	Steel.....	1		48		With keys.
Tripping-shaft levers.	On tripping shaft	Forged steel.....	2				
Wrench.....	For filling plugs.....	Steel.....	1				
Wrench, single.....	For 1-inch nuts.....	do.....	1				
Do.....	For 1-inch nuts.....	do.....	1				
Do.....	For 2-inch nuts.....	do.....	2				
Wrench, double.....	For 1 and 1 inch nuts.....	do.....	1				
Do.....	For 1 and 1 inch nuts.....	do.....	1				
Do.....	For 1 and 1 inch nuts.....	do.....	1				
Wrench, spanner.....	With carriage.....	do.....	1				

ELECTRICAL FIRING GEAR.

Battery box	On battery bracket	Black walnut..	1				Complete with 6 Meeco dry cells.
Battery bracket	On sight standard.....	Steel.....	1				
Binding bolts.....	Spring insulation	Brass.....	2	0.25	0.618	4	
Binding post.....	On buzzer board	do.....	1				Conical.
Do.....	do.....	do.....	1				Cylindrical.
Binding-post cables.	On binding post in pistol.	Covered copper wires.	2				Complete.
Binding-post screws	Binding posts to buzzer board.	Steel.....	2	.125	.406		Cheese head.
Binding screw.....	Conical binding post.....	Brass.....	1	.125	.219		Do.
Binding stud.....	Spiral to buzzer board ..	do.....	1	.125	.686	1	
Do.....	For binding-post cable to spring insulation.	do.....	1	.25	.906	2	
Do.....	On sight standard for battery cable.	do.....	1	.25	1.45	1	
Binding-stud nut...	In buzzer board on binding stud.	do.....	1				0.125-inch tap.
Bracket bolt.....	Battery bracket.....	Steel.....	1	.5	9.8	1	Hexagonal head.
Bracket bolts.....	For battery bracket.....	do.....	4	.625	1.125		Countersunk.
Button gland.....	In pistol frame.....	Brass.....	1				
Buzzer.....	On buzzer board.....	Brass and steel..	1				Complete.
Buzzer board.....	Pistol cover.....	Hard rubber.....	1				
Buzzer-board nuts..	For buzzer-board screws.	Brass.....	2				0.187-inch tap.
Buzzer-board screws	Buzzer board to pistol frame.	do.....	2	.187	.631		Countersunk.
Buzzer frame.....	To buzzer board	do.....	1				
Buzzer-frame bolt..	Buzzer frame to buzzer board.	Steel.....	1	.187	.375		Cheese head.
Do.....	Magnet header to buzzer frame.	Brass.....	1	.125	1.5		Countersunk.
Buzzer pivots.....	Buzzer to buzzer frame ..	Steel.....	2	.068	.312		
Cable.....	Battery to sight standard.	Covered copper wires.	1		12		
Do.....	Pistol to battery	do.....	1		78		Complete with 1 coupling.
Do.....	Bracket to pistol.....	do.....	1		60		Complete with 2 couplings.
Do.....	Firing pin to surface holder.	do.....	1				Complete with 2 couplings and 4 thimbles.
Cable couplings....	On cables.....	Bronze.....	4				
Contact pin.....	In contact-pin holder.....	Brass.....	1				
Contact-pin cap.....	do.....	do.....	1				
Contact-pin holder..	In pin-plug bracket.....	Bronze.....	1				
Contact screws.....	For binding posts.....	Steel.....	2	.46			Cheese head.
Contact surface.....	In contact-surface holder	Brass.....	1				special.
Contact-surface bolt	Contact surface to surface insulation.	do.....	1	.375			Special.

Names of the parts with their location and the material of which they are made—Continued.

ELECTRICAL FIRING GEAR—Continued.

Name of parts.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Contact-surface holder.	In contact-surface plug block.	Bronze	1	Inch.	Inch.		
Contact-surface insulation.	In contact-surface holder	Hard rubber...	1				
Contact-surface plug block.	On top carriage	Bronze	1				
Firing-pin cable coupling.	On breech of gun	do	1				Complete.
Firing-pin cable locking pin.	On block-carrier hinge ..	do	1				
Firing-pin cable thimbles.	Firing-pin cable	Galvanized iron.	4				
Header bolts	Magnet header to buzzer board.	Steel	2	.187	.5		Cheese head.
Insulation binding bolts.	Surface insulation to surface holder.	Brass	2	.125	.39		Set screw.
Key heads	On locking key	Bronze	2				
Locking keys	Pin-plug bracket and contact-surface plug block.	do	2				
Magnet bars	In magnet spools	Magnet iron...	2	.281	1.515		
Magnet header	On top of magnet spools	Lead	1				
Magnet screws	Magnet header to magnet bar.	Steel	2	.14	.631		Countersunk.
Magnet spools	On magnet bar	Hard rubber...	2				Wound with copper wire.
Nipples	Pistol cover	Brass	2				
Pin insulation	In contact-pin holder...	Hard rubber...	1				
Pin-plug bracket...	Left chassis	Bronze	1				
Pin spring	Contact-pin holder	Brass	1				
Pistol bolt	On pistol frame	do	1	.25	.25		Knurled head
Pistol bracket	On sight standard	Bronze	1				
Pistol cover	On pistol frame	do	1				
Pistol frame	On pistol bracket	do	1				
Push button	Pistol frame	Brass	1				With glass point.
Push-button spring.	do	do	1				
Resistance spool...	On buzzer board	Hard rubber...	1				Wound with German silver wire.
Spiral	do	Brass	1				
Spool wood screw ..	Resistance spool to buzzer board.	do	1	.125	.437		Countersunk.
Spring insulation...	On pistol cover	Hard rubber...	1				
Spring-insulation screws.	Spring insulation to pistol cover.	Brass	2	.25	.469		Cheese head.
Tap bolts	Spiral to buzzer board ..	do	2	.096	.217		Do.
Trigger	On pivot	Bronze	1				
Trigger spring	On spring insulation...	Brass	1				
Trigger pivot	In frame	do	1	.25	.968		
Twisted hook	On top carriage, gun, gun lever, and elevating band.	Steel	6				
Washers	Under binding-bolt head.	Hard rubber...	2				

SHOT TRUCK.

(Price of truck separately, \$140.)

Axle brackets	Frame	Cast steel	2				With pins.
Frame	On axle brackets and guide-wheel axles.	Rolled iron...	1			4	With bolts and rivets.
Guide wheels	On guide-wheel axles...	Cast steel	2				With bronze bushings and oil plugs.
Guide-wheel axles...	In guide wheels	Steel	2				With split pins.
Handle	Frame	Ash	1				With rivets.
Wheels	On wheel axle	Cast steel	2				With bronze bushings and oil plugs.
Wheel axle	In axle brackets	Steel	1			2	With washer.

6-INCH BARBETTE CARRIAGE (PEDESTAL MOUNT), MODEL 1900.

(Price of carriage, \$3,465.23.)

Names of parts, with their location and the material of which they are made, etc.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
				Inch.	Inch.		
Ball thrust bearing.	In pedestal	Steel	1				2 cups; 28 0.75-inch steel balls hardened and ground.
Bolts, stud	Friction band to pedestal	do	1	1.35	3.4		
Bolts, washer head.	Cap square to pivot yoke	do	4	1.5	4.25		
Do	Leveling screws	do	4	1.5	3		
Do	Filling and drain plugs	do	4	1	1.25		
Do	do	do	2	.625	.625		1 extra.
Bolts, hexagonal heads.	Elevation pointer	do	1	.75	1.875		
Do	Shoulder rest to elevating bracket	do	2	1	4		
Do	do	do	1	1	2.25		
Do	Shoulder rest tubes	do	3	.5	1.875		
Do	Elevating bracket to platform bracket	do	5	1.25	4.25	5	0.3125 by 2 inch split pin through each bolt.
Do	Firing pistol fastening to shoulder rest	do	1	.5	1.5		
Do	do	do	1	.5	.94		Special.
Do	Sight bracket to cradle	do	12	.75	1.625		
Do	Platform bracket to yoke	do	2	2	4		
Do	do	do	2	1.5	3		
Do	Upper traversing shaft bearing to shoulder rest	do	2	1	1.875		
Do	Shoulder rest to platform bracket	do	4	1	3.3125	4	
Do	Shoulder rest to tube	do	3	.5	1.875		
Do	Shoulder guard to cradle	do	2	.75	1.875		
Do	do	do	2	.75	1		
Do	Battery bracket to platform bracket	do	2	.625	.875		
Do	Friction band	do	1	.75	14.75	2	
Do	Covers to pedestal	do	24	.75	1.5		
Do	Springs to pivot yoke	do	12	2	5.25		
Do	Spring case extension to cradle	do	2	1	1.48		Special.
Do	Platform bracket to yoke	do	2	2	4		
Do	do	do	2	1.5	3		
Do	Upper traversing shaft bearing to elevating bracket	do	2	1	1.875		
Do	Traversing worm-wheel case to yoke	do	8	1	2.75		
Do	Lower traversing shaft bearing to platform bracket	do	4	1	3.5825	4	0.1875 by 1.5 inch split pins through each bolt.
Do	Traversing worm-wheel case	do	6	.625	2.1875	6	0.1875 by 1.25 inch split pin through each bolt.
Do	Traversing worm shaft bearing to platform bracket	do	4	1	2.5		
Do	Traversing worm cap to traversing gear case	do	4	.75	2		
Do	do	do	2	.625	2.25	2	One-half head cut off.
Do	Elevating rack to cradle	do	2	1.125	2.625		
Do	do	do	2	1.125	2.375		
Do	Elevating worm-wheel cover	do	7	.75	2.625		
Bushing	Hydraulic cylinder head	Bronze No. 3	1				Two 0.5 by 0.75 inch pins driven at 2.75 inch right and 80° from cylinder head.
Do	Bottom of pedestal	Bronze	1				Forced in.

Names of parts, with their location and the material of which they are made, etc.—Cont'd.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Name.	Remarks.
Bushing.....	Top of pedestal.....	Bronze.....	1	Inch.	Inch.		Forced in 16 0.75 by 1.75 inch pins driven stag- gered.
Capsquares.....	Pivot yoke.....	Cast steel No. 2.	2				
Counter recoil buf- fer.	Bolted to front of hy- draulic cylinder.	Tobin bronze..	1				1 nut.
Counter recoil cyl- inder.	Cast on cradle.....	Cast steel.....	1				
Counter recoil spring cylinder.	.....do.....	.....do.....	2				
Counter recoil springs.	In spring cylinders.....	Steel.....	8				2 sizes.
Covers.....	Holes in pedestal.....	Steel plate.....	4				Garlock gasket packing 0.25 thick to stand oil and water.
Cradle.....	Pivot yoke.....	Cast steel No. 2.	1				
Direction plate.....	On cylinder.....	Bronze.....	1				
Elevating bevel gears.	On elevating shaft.....	Bronze No. 3.	1				3.75-inch P. D., 15 teeth.
Do.....	do.....	Steel.....	1				3-inch P. D., 12 teeth.
Elevating bracket..	Bolted to platform bracket.	Cast steel.....	1				
Elevating friction disks.	Elevating worm wheel..	Cast iron No. 1.	3				
Elevating friction rings.	.....do.....	Bronze.....	1				
Elevating hand wheel.	Elevating hand-wheel shaft.	.....do.....	1				
Elevating hand- wheel shaft.	Elevating hand wheel...	Forged steel...	1				Two 0.1875 by 1.5 inch split pins.
Elevating pinion shaft and nut.	Elevating worm-wheel cover.	.....do.....	1				1 bronze wash- er; 1 steel bushing; one 2-inch nut; 12 teeth, 25 per inch.
Elevating pointer..	Elevating bracket.....	Bronze.....	1				German silver on top.
Elevating rack.....	Bolted to cradle.....	Bronze No. 3..	1				Complete, 175 teeth, 40 teeth, 75 pitch.
Elevating-rack graduation strip.	Elevation rack.....	German silver..	1				
Elevating worm shaft.	In bracket.....	Forged steel...	1				Worm, 0.75; pitch, 0.75; L. R. H.
Elevating worm wheel.	Elevating shaft.....	Bronze No. 3..	1				
Elevating worm- wheel cover.	On bracket.....	Cast steel.....	1				
Filler piece.....	On recoil band.....	Steel.....	1				
Filling funnel.....	Filling cylinder.....	Copper.....	1				
Firing cable.....	Firing pistol.....	.....do.....	1		157		No. 16 flexible 8-braid weatherproof wire.
Firing-cable con- nection.	On cable.....	Bronze.....	1				
Firing-cable hooks.	Screwed in cradle.....	Steel.....	2				
Firing-cable thim- ble.	On cable.....	Galvanized iron.	2				
Firing-pistol fasten- ing.	Bolted to shoulder rest...	Cast iron.....	1				
Friction band.....	Traversing worm wheel..	Steel.....	1				
Friction-band spring.	On friction band.....	.....do.....	1				
Follower.....	Stuffing box.....	.....do.....	1				In two parts.
Gaskets.....	Rear cylinder head.....	Vulcanized fiber.	1				0.06 inch thick.
Do.....	Filling and drain plugs..	.....do.....	4				0.25 by 0.94 by 0.06 inch.

Names of parts, with their location and the material of which they are made, etc.—Cont'd.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Notes.	Remarks.
Gaskets.....	Filling and drain plugs..	Vulcanised fiber.	2	Ins.	Ins.		1 by 1.5 by 0.06 inch.
Gland	Rear cylinder head.....	Bronze No. 3..	1				
Gunners' platform..	Platform brackets.....	Steel plate.....	2				Right and left.
Hand-wheel sleeve..	On hand-wheel stem.....	Bronze.....	3				
Hand-wheel stem ..	On hand wheel.....	Steel.....	3				
Liner.....	Cradle.....	Bronze No. 3 ..	2				
Do.....	Counter recoil cylinder..	Forged steel No. 2.	1				Grooved at bottom.
Name plate.....	On cradle.....	Bronze.....	1				
Oil can.....	Oiling bearings.....	Brass.....	1				One-half pint.
Oil can, locomotive.	do.....	do.....	1				1 quart.
Oil tubes.....	In pivot yoke.....	do.....	1	8.125			Seamless brass tubing.
Pedestal.....	On foundation.....	Cast steel No. 2	1				
Piston liner.....	On piston.....	Annealed copper.	1				
Piston rod and nuts.	In recoil cylinder.....	Forged steel No. 3.	1				2 nuts 8.75 inch, 6 threads per inch.
Pivot yoke.....	In pedestal.....	Cast steel No. 2	1				
Platform bracket...	Bolted to pivot yoke.....	Cast steel No. 1	2				Right and left.
Plug.....	Top of pivot yoke.....	Bronze.....	1	8.625	1		5 threads per inch U. S. S.
Rear cylinder head.	Rear end counter recoil cylinder.	Steel.....	1				
Rear cylinder-head bushing.	Rear cylinder head.....	Bronze No. 3 ..	1				Two 0.5 by 0.75 pins.
Recoil band.....	Part of gun.....	Forged steel No. 3.	1				Shrunk on gun.
Screw countersunk.	Name and direction plate	Bronze.....	4	.25	.5		
Screw-drivers.....	Electrical apparatus.....	Steel and wood	1		7		
Do.....	do.....	do.....	1		10		
Shield.....	Bolted to springs.....	Steel.....	1				
Shield springs.....	Bolted to shield.....	do.....	2				
Shoulder guard.....	Bolted to cradle.....	Bronze.....	2				
Shoulder rest.....	Bolted to elevating bracket.	Cast steel.....	1				Left hand
Do.....	do.....	Cast iron.....	1				Right hand.
Spring stirrup.....	Between springs.....	Steel tubing..	2	5.75	38.25		
Spring case extension.	Over springs.....	Steel.....	2				Steel tubing.
Spring case extension head.	Spring case extension ..	Bronze No. 3 ..	2				
Spring covers.....	On oil holes.....	Steel.....	34				
Spring rods.....	Through springs.....	Forged steel No. 3.	2			2	Finished all over; heads threaded and pinned.
Spring separators..	Between springs.....	Steel.....	4				
Spring yoke.....	On spring rods.....	Forged steel No. 2.	1				
Step.....	In pedestal.....	Steel.....	1				Hardened and finished.
Thrust plates.....	Under leveling screws ..	do.....	4				
Traversing bevel gears.	Traversing shaft.....	Bronze.....	4				2 right side, 2 left side.
Traversing-gear case.	Over traversing gear.....	do.....	1				In two parts.
Traversing hand wheel.	Traversing shafts.....	do.....	2				Four 0.1875 by 3 inch taper split pin, two 0.1875 by 1.5 inch split pin; right and left.
Traversing shaft...	Traversing shaft bearing.	Forged steel...	2				
Traversing shaft lower bearing.	Platform bracket.....	Bronze.....	2				Right and left.
Traversing shaft upper bearing.	do.....	do.....	2				Do.
Traversing-shaft collars.	Traversing shaft.....	Steel.....	2				Two 0.25 by 2.75 inch taper split pins.
Traversing-worm wheel.	On pedestal.....	Bronze No. 3 ..	1				51 teeth, 1-inch pitch.

Names of parts, with their location and the material of which they are made, etc.—Cont'd.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Remarks.
Traversing-worm shaft.	In bearings	Forged steel...	1	Inch.	Inch.	.....	Worm, right-hand, 1-inch pitch, 1-inch lead.
Traversing worm-wheel shaft bearing.	Platform bracket	Bronze	2	.....	.....	.....	1 right, 1 left.
Trunnion-bed liner.	Trunnion bed.....	.....do.....	2	.....	.....	.....	In halves.
Washer.....	On pedestal.....	Bronze	1	.....	.....	.....
Wrench (double end).	2-inch and 1.6-inch nuts..	Forged steel...	1	.....	.....	.....
Do.....	1.25-inch and 1-inch nuts.	.....do.....	1	.....	.....	.....
Wrench (single end).	Gland and piston rod.....	.....do.....	1	.....	.....	.....
Do.....	Cylinder head .....	.....do.....	1	.....	.....	.....
Do.....	Filling and drain plugs..	.....do.....	1	.....	.....	.....

* NOTE.—This list does not contain the items relating to the sights and electric-firing apparatus. As soon as these parts are definitely ascertained they will be issued in circular form for insertion in the manual at the proper place.

SPARE PARTS FOR CARRIAGES.

The following spare parts for 6-inch disappearing carriage, model 1898, are issued to the service:

	Price.
$\frac{1}{2}$ set small gaskets	per set.. \$2.00
1 set large gaskets.....	do..... 2.24
1 set retraction ropes.....	each.. 2.72
1 set keys	do..... .22
1 set crosshead pawl springs.....	do..... .17
1 set safety latch stops.....	do..... 1.00
1 set buffer springs.....	do..... 4.35
1 set spring pivots.....	per set.. .66
$\frac{1}{2}$ set headless screws	each.. .01
1 set filling plugs.....	do..... .50
$\frac{1}{2}$ set studs for rear stuffing boxes.....	do..... .40
1 set hydraulic packing	do..... .35
$\frac{1}{2}$ set throttling-bar bolts.....	each.. .50
1 set traversing stops	do..... .50
1 set of elevating stops.....	do..... 1.00
1 set Yale locks No. 853	do..... .13
1 set of elevating pointer screws.....	do..... .06
1 set of dust guard bolts.....	do..... .50
1 set of extractors for cylinder heads	do..... .66
1 set of twisted hooks for holding firing cable.....	do..... .66
1 ratchet-wheel pawl pin	do..... .40
4 studs for rope clamp.....	do..... .25
12 oil-hole plugs, 0.625 inch	do..... .25
12 oil-hole plugs, 0.375 inch.....	do..... .05
2 azimuth pointer dowel pins	each.. .13
2 azimuth pointer screws.....	do..... .25
1 clutch spring.....	do..... .03
$\frac{1}{2}$ set screws for name and direction plates	do..... .50
2 sight locking screws	do..... 1.00
2 sight clamps	do..... 1.50
1 shot-truck handle	do..... 60.00
1 set electrical firing attachments (firing cable separate, each \$12)	

In addition to these spare parts the following additional articles are kept on hand for repairs, but only issued to district armament officers, to wit: Price.

1 set equalizing pipes and throttling device, complete.....	
2 set ball bearings	
1 complete set Mossberg roller bearings	

The following spare parts for 6-inch barbette carriage, model 1900 (pedestal mount), are issued to the service: Price.

1 set of gaskets	
1 set of filling plugs	
1 set of hydraulic packing	
5 spring covers for oil holes, small, with screws	
3 spring covers for oil holes, large, with screws	
6 bolts for covers of pedestal	
1 set of split pins	

NOTE.—A complete set of these parts as far as applicable to carriages mounted at any post should always be kept on hand. In ordering parts of any carriage always specify the kind, model, and number of carriage for which parts are required.

NOTE.—For annual allowance of paints and materials for cleaning and preservation see supply table, pp. 359 and 360.

For further details as to care, instructions, etc., see pamphlets issued by Ordnance Department, U. S. Army, "Instructions for Mounting 6-inch Disappearing Carriage, L. F., Model 1898."

CONTENTS OF ARMAMENT CHEST FOR 6-INCH R. F. GUN, MODELS 1897 AND 1897 M1.

(Price of armament chest, \$45.)

	Price each.
1 loading tray	\$7.50
1 bar screw-driver for spindle nut and pinion pivot .....	.75
1 bar screw-driver for gear segment screw, latch lever pivot screw, spindle key screw, slide housing spline screw, tripping stud screw, latch bolt seat screw .....	.75
1 bar screw-driver for sight bracket screw, firing leaf pivot screw, circuit breaker housing screw, firing cable cleat screw .....	.75
1 commercial screw-driver for contact plate screws, and ejector roller shutter screws .....	.40
1 gunner's pouch	2.25
1 pair gunner's sleeves	per pair.. 1.18
1 gunner's gimlet .....	.55
1 gunner's punch .....	.90
1 gunner's reamer .....	.60
1 cleaning reamer for primer seat	1.00
1 gunner's lanyard	1.15
1 file, flat, dead smooth, 8-inch .....	.13
1 file, half round, smooth, 8-inch .....	.13
1 file, round, second cut, 8-inch .....	.07
1 file, three-cornered .....	.08
1 hammer, copper	1.25
1 hammer, boilermaker's .....	.75
1 mallet, hand .....	.16
1 mallet, long-handled .....	.60
1 metal scraper .....	.43
2 oilers, half pint .....	.13
1 pin punch .....	.50

	Price each.
1 pair cutting pliers	\$0. 60
1 monkey wrench, 15-inch .....	. 90
1 monkey wrench, 12-inch .....	. 52
1 quire emery cloth, No. 00	per quire.. .44
12 silk wipers, or cotton waste ^c.....	. 10
3 sponges (wagon).....	per pound.. 2. 38
1 bronze drift (large).....	. 40
1 bronze drift (small).....	. 25
4 balls twine, assorted.....	per pound.. .15
2 pounds copper wire, No. 12.....	do..... .20
2 pounds copper wire, No. 16.....	do..... .20

CONTENTS OF IMPLEMENT CHEST FOR 6-INCH DISAPPEARING CARRIAGE
L. F., MODEL 1898.

1 oiler, 1 quart	
1 extractor for gun lever and suspension-rod pins.....	
2 screw-drivers, steel	
2 screw-drivers, commercial.....	
2 S-hooks for lifting counterweights	
1 spanner wrench for stuffing box	
1 double wrench for $\frac{1}{2}$ and $\frac{3}{4}$ inch nuts	
1 double wrench for $\frac{1}{2}$ and $\frac{3}{4}$ inch nuts.....	
1 double wrench for $\frac{1}{2}$ and 1 inch nuts.....	
1 single wrench for $1\frac{1}{4}$ -inch nut.....	
1 single wrench for $1\frac{1}{4}$ -inch nut.....	
2 single wrenches for piston-rod nuts	
1 box wrench for filling plugs	
2 cylinder-head extractors	
3 retraction ropes	

The following articles, being too large, are not to be kept in the chest:

2 pinch bars	
2 water buckets, indurated fiber.....	

CONTENTS OF COMBINATION ARMAMENT CHEST FOR 6-INCH R. F. GUN, MODELS 1897
AND 1898 M1, ON DISAPPEARING CARRIAGE, L. F., MODEL 1898.

The contents of this armament chest are all the tools and implements enumerated for the armament chest for the gun and implement chest for the carriage on pages 256 and 257.

CONTENTS OF COMBINATION ARMAMENT CHEST FOR 6-INCH R. F. GUN, MODEL 1900,
ON PEDESTAL MOUNT, MODEL 1900:

(Price of armament chest, \$45.)

FOR GUN.

	Price each.
1 bar screw-driver for spindle nut and pinion pivot.....	\$0. 75
1 bar screw-driver for gear segment screw, latch lever pivot screw, spindle key screw, slide housing spline screw, tripping stud screw, latch bolt seat screw .....	. 75
1 bar screw-driver for sight bracket screw, firing leaf pivot screw, circuit breaker housing screw, firing cable cleat screw .....	. 75

^a10 pounds of cotton waste to be supplied in lieu of 12 silk wipers.

Price each.

1 commercial screw-driver for contact plate screws and ejector roller shutter screws.....	\$0.75
1 gunner's punch.....	.90
1 gunner's reamer.....	.60
1 gunner's reamer for primer seat.....	1.00
1 gunner's gimlet.....	.55
1 file, flat, dead smooth.....	.13
1 file, round, second cut.....	.07
1 file, half round, smooth.....	.13
1 file, three-cornered.....	.08
1 pin punch.....	.50
1 gunner's pouch.....	2.25
1 gunner's lanyard.....	1.15
1 pair gunner's sleeves.....per pair..	1.18
1 quire emery cloth, No. 00.....per quire..	.44
12 silk wipers, cotton waste ^a.....	.10
3 wagon sponges.....per pound..	2.38
4 balls twine, assorted.....do.....	.15
2 pounds copper wire, No. 12.....do.....	.20
2 pounds copper wire, No. 16.....do.....	.20
1 copper hammer.....	1.25
1 boilermaker's hammer.....	.75
1 hand mallet.....	.16
1 bronze drift (large).....	.40
1 bronze drift (small).....	.25
2 oilers, half pint.....	.13
1 monkey (screw) wrench, 15-inch.....	.90
1 monkey (screw) wrench, 12-inch.....	.52
1 mallet, long handled.....	.60
1 metal scraper (for removing paints, etc.).....	.43
1 pair cutting pliers.....	.60
1 loading tray.....	7.50

FOR CARRIAGE.

1 locomotive oiler, 1 quart.....	
2 screw-drivers (for electrical attachments), one 7-inch, one 10-inch.....	
1 single wrench for cylinder head.....	
1 single wrench for gland and piston rod.....	
1 single wrench for filling and drain plugs.....	
1 double wrench, 3.125-inch and 2.375-inch nuts.....	
1 double wrench, 2-inch and 1.625-inch nuts.....	
1 box wrench.....	
1 filling funnel, copper.....	

^a Ten pounds of cotton waste to be issued in lieu of 12 silk wipers.

CHAPTER VII

4-INCH RAPID-FIRE GUNS, 4.72 AND 6-INCH ARMSTRONG RAPID-FIRE GUNS, AND 6 AND 15 POUNDER GUNS.

LIST OF SPARE PARTS FOR ISSUE, ETC.

4-INCH R. F. GUNS (DRIGGS-SCHROEDER).

(Price of gun and mount, \$7,500.)

Caliber, 4 inches.
Center of gravity from face of breech, 58 inches.
Total length, 164 inches.
Length of bore, 157.5 inches.
Length of bore, 39.4 calibers.
Travel of shell, 33 calibers.
Number of grooves, 30.
Depth of grooves, 0.025 inch.
Width of grooves, 0.279 inch.
Weight of breechblock, 74 pounds.
Weight of gun complete, 3,500 pounds.
Weight of powder charge (black), 12 to 14 pounds.
Volume of chamber, 362.7 cubic inches.
Ratio of gun weight to projectile, 106.1.
Muzzle velocity, 2,000 feet per second.
Muzzle energy, 915 foot-tons.
Energy per ton of gun, 586 foot-tons.

The breech mechanism of this gun consists of 12 movable or tactical pieces, as follows:

- 1 breechblock.
- 1 main bolt.
- 1 firing pin.
- 1 firing spring.
- 1 cam.
- 1 face plate.
- 1 sear.
- 1 sear spring.
- 1 operating handle.
- 1 handle-locking spring.
- 2 extractors, right and left.

There are but 4 of these guns in the service.

SIGHTS.

The gun is provided with a front and rear sight. The front sight is fastened to the trunnions of cradle by two screws, and consists of a bronze base with a ring holding

single cross wires. The rear sight is a bar sight operated by an operating wheel in a sight box, fastened to the rear of the gun body by four screws. The sight bar is graduated in 100-yard spaces in range, provided with an eye piece with double cross wires and a cross bar, graduated in spaces representing 10 minutes of horizontal arc. The top of rear sight is provided with a notch, and the top of the front sight with a small point, to be used for quick sighting or as a finder.

FUSES.

The fuses used with the projectile for the 4-inch rapid-fire gun (Driggs-Schroeder) is the "Driggs percussion fuse," consisting of the body, the plunger or pellet, the spring, and the detonating cap.

AMMUNITION.

The ammunition used with these guns is fixed ammunition-metallic cartridge cases loaded with smokeless or black powder and armor-piercing steel and cast-iron (common) shell of the following weights and dimensions, to wit:

Steel shell:

Total length, 12.10 inches.
Weight of shell, 32.2 pounds.
Weight of burster, 0.67 pound.
Weight of fuse, 0.133 pound.
Weight, total, 33 pounds.

Common shell:

Total length, 15.1 inches.
Weight of shell, 30.96 pounds.
Weight of burster, 1.9 pounds.
Weight of fuse, 0.133 pound.
Weight, total, 33 pounds.

Fixed ammunition:

Total length (steel shell), 44.77 inches.
Total length (common shell), 47.77 inches.
Weight of empty shell, 192 ounces.
Weight of charge, 192 to 224 ounces.

Price steel shell \$18 per round.

Price C. I. shell \$16 per round.

CLEANING MATERIAL.

For allowance of cleaning material, etc., per annum, see supply table, pages 359 and 360.

SPARE PARTS OF GUN.

The following spare parts are issued for each 4-inch rapid-fire gun (Driggs-Schroeder), to wit:

Parts.	Price each.
2 firing-pin points	\$1.25
3 firing-pin springs .....	.20
2 sear springs	4.00
2 handle-locking springs	3.07
1 firing pin	16.25
2 extractors, right and left	15.00
1 sear	12.00
1 guide bolt	2.15
1 main-bolt spring	8.50

A set of these spare parts should always be kept on hand at post. In ordering spare parts, give the name of maker, model, and number of gun for which parts are required.

SUBCALIBER TUBES.

One-pounder subcaliber tubes are issued for use with 4-inch rapid-fire guns (Driggs-Schroeder), one to each post having guns of this caliber mounted. The list of parts of tube and fixtures is as follows:

- 1 gun.
- 1 center support.
- 1 muzzle support.
- 1 expanding screw.

The following accessories and spare parts are furnished with each subcaliber tube:

- 1 hand extractor.
- 1 handspike.
- 1 bristol sponge.
- 1 sponge rod.
- 1 dismounting pin.
- 1 clamping screw-driver (for both clamp and screw).
- 1 clip extractor.
- 1 oil can.
- 1 breech cover. } Or cover for entire tube.
- 1 muzzle cover. }
- 1 storage chest.

Spare part:

- 1 expanding screw.

Price of subcaliber tube complete with accessories \$245.

DRILL-CARTRIDGE.

There are also issued for use with the 4-inch rapid fire guns (Driggs-Schroeder) drill (dummy) cartridges. The allowance of these cartridges is 4 per gun per post. (Price of cartridges, each, \$5.60.)

4-INCH RAPID-FIRE GUN MOUNT (DRIGGS-SCHROEDER).

The mount for the 4-inch rapid fire gun (Driggs-Schroeder) is the Driggs hydraulic recoil mount. This mount consists principally of the cage stand, Y or pivot, cradle, sleeve, hydraulic-recoil-cylinder springs, shoulder rest, with trigger and wire cable lanyard. A training clamp is fitted to cage stand to clamp pivot against lateral train, and an elevating clamp through saddle to clamp the cradle against vertical train.

SPARE PARTS FOR CARRIAGE.

The following spare parts for 4-inch rapid-fire gun mount are issued to the service, to wit:

Parts.	Price each.
2 filling-hole plugs with washers.....
2 air-hole plugs with washers.....
2 sets of packing for recoil cylinders.....
4 gaskets for stuffing box and cylinder head.....
2 friction disks.....
2 piston screws.....
1 elevating-gear spring.....
2 buffer springs.....
4 counter-recoil springs.....
1 pivot-hole cover and screws.....

Parts.	Price each.
1 set of upper antifriction washers with balls	
1 set of antifriction rollers	
1 adjusting nut-binding screw	
2 screws for worm	
5 worm-wheel screws	
1 sight complete (rear)	
4 oil-hole plugs, $\frac{1}{8}$ inch	
1 taper pin for elevating bevel pinion shaft	
1 screw for traversing bevel pinion collar	
1 key for each of the elevating shafts	
1 screw for each of the elevating shafts	
1 sponge	

NOTE.—A complete set of these parts should be kept on hand at post. In ordering parts always specify the kind, model, and number of carriage to which the parts belong.

For allowance of paints and materials for cleaning and preservation annually, see supply table, pages 359 and 360.

TOOLS AND IMPLEMENTS.

The following tools and implements constitute a set for each 4-inch rapid-fire gun (Driggs-Schroeder) and mount:

Parts.	Price each.
8 wrenches for nuts	
1 dismounting pin wrench (dismounting pin)	\$2.00
1 hand extractor (pair)	3.00
1 combination hook and wrench (dismounting screw-driver)	4.00
1 lanyard .....	.90
1 babbit hammer .....	.85
1 screw-driver, small .....	.75
1 oil can .....	.90
1 sponge (bristol) and rod	14.00
1 cleaning brush .....	.50
1 block nipping rod .....	.80
1 breech-mechanism tool	5.00
1 tool, accessories, and spare-part box	8.00

DECAPPING TOOLS.

There are issued to each post equipped with 4-inch Driggs-Schroeder rapid-fire guns one set of decapping tools. These sets are termed "Decapping set for 4-inch R. F. case," and are composed of the following:

	Price each.
1 bronze capping and decapping anvils	\$2.75
1 bronze decapping guide	8.50
1 steel decapping spindle, long	1.40
1 steel capping spindle, short .....	.37
Total	8.02

^a Recessed one side for capping, the other decapping.

There are also issued to each post equipped with 4-inch Driggs-Schroeder rapid-fire guns one set of tools for decapping and cleaning 1-pounder subcaliber ammunition. These sets are termed "Decapping and cleaning sets for 1-pounder subcaliber ammunition," and are composed of the following:

	Price each.
1 decapping spindle	\$
1 decapping anvil	
1 cleaning brush	
Total	\$2.50

4.72-INCH R. F. GUN (ARMSTRONG)**40 CALIBERS.**

For full details as to care, preservation, etc., see pamphlets "Instructions for 4.7-inch B. L. Armstrong Guns" (40 calibers, 45 calibers, and 50 calibers), issued by Ordnance Department.

WEIGHTS, DIMENSIONS, ETC., OF 4.72-INCH RAPID-FIRE GUN (ARMSTRONG), 40 CALIBERS.

Weight, 4,648 pounds.
 Total length, 16.18 feet.
 Length of bore, 40 calibers.
 Maximum diameter of breech, 0.15 inch.
 Diameter of muzzle, —.
 Diameter of trunnions, —.
 Length of trunnions, —.
 Distance between rimbases, —.
 Distance of axis of trunnions from muzzle, —.
 Powder chamber :
 Diameter, 4.90 inches.
 Length, 15.250 inches.
 Capacity, 285 cubic inches.
 Travel of projectile in bore, — calibers, 172.871 inches.
 Projectile :

Kind.	C. I. shell.	Steel shell.	Strong head.	Shrapnel.
Weight, filled.....pounds..	45	45	45	45
Ratio of weight to weight of piece.....	rtz	rtz	rtz	rtz
Weight of bursting charge (rifle powder), pounds.....	1.2	4.5	2	.10
Length.....calibers..	3	3.6	3	a2.8
Sectional density.....	2.57	2.57	2.57	2.57
Price without case, fuse, or bursting charge..	\$6.00	\$15.00	.....	\$8.00
Price of cartridge case filled, service charge..	10.20	.....	.....	.....
Price of cartridge case separate.....	8.90	.....	.....	.....

a With fuse.

Powder :

Kind, black and smokeless (cordite).
 Weight, 12 pounds black ; 5.50 ^a pounds smokeless.
 Density of loading, 1.1655 black ; 0.5342 smokeless.

Muzzle velocity :

Black, 1,786 feet per second.
 Smokeless, 2,150 feet per second.

Maximum pressure per square inch :

Black and smokeless, 34,000 pounds.

Muzzle energy :

Black, 995 foot-tons.
 Smokeless, 1,442 foot-tons.

Terminal velocity:

Black, 1,440 feet per second at 1,000 yards; 818 feet per second at 5,000 yards.
 Smokeless, 1,776 feet per second at 1,000 yards; 971 feet per second at 5,000 yards.

^a Does not include igniting charge.

Rifling:

Number of grooves, 22.

Width, —.

Depth, 0.040 inch.

Width of lands, —.

Twist of rifling, one ^a turn in 100 calibers at breech to 1 turn in 34.352 calibers at 6.65 inches from muzzle; the remainder, 1 turn in 34.352 calibers.**4.72-INOCH R. F. GUN (ARMSTRONG).****.45 CALIBERS.**

Weight, 4,958 pounds.

Total length, 17.70 feet.

Length of bore, 43.9 calibers.

Maximum diameter of breech, 15.35 inches.

Diameter of muzzle, —.

Diameter of trunnions, —.

Length of trunnions, —.

Distance between rimbases, —.

Distance of axis of trunnions from muzzle, —.

Powder chamber:

Diameter, 4.90 inches.

Length, 25.300 inches.

Capacity, 496 cubic inches.

Travel of projectile in bore, — calibers, 181.496 inches.

Projectile:

Kind.	C. I. shell.	Steel shell.	Strong head.	Shrapnel.
Weight, filled .....pounds..	45	45	45	45
Ratio of weight to weight of piece	1½	1½	1½	1½
Weight of bursting charge (rifle powder). pounds.....	1.2	4.5	2	.10
Length .....calibers..	8	8.6	8	2.8
Sectional density	2.57	2.57	2.57	2.57
Price without case, fuse, or bursting charge..	\$6.00	\$13.00	.....	\$5.00
Price of cartridge case filled, service charge.	\$14.00	.....	.....	.....
Price of cartridge case separate.....	\$4.75	.....	.....	.....

^a With fuse.**Powder:**

Kind, black and smokeless (cordite).

Weight, 13.60 pounds black; 8.20 ^b pounds smokeless.

Density of loading, 0.7590 black; 0.4578 smokeless.

Muzzle velocity:

Black, 1,786 feet per second.

Smokeless, 2,570 feet per second.

Maximum pressure per square inch, black and smokeless, 34,000 pounds.

Muzzle energy:

Black, 995 foot-tons.

Smokeless, 2,061 foot-tons.

Terminal velocity, feet per second:

Black, 1,440 feet per second at 1,000 yards; 818 feet per second at 5,000 yards.

Smokeless, 2,089 feet per second at 1,000 yards; 1,012 feet per second at 5,000 yards.

^a Spiral.^b Does not include igniting charge.

Rifling:

Number of grooves, 28.
 Width, 0.3400 inch.
 Depth, 0.040 inch.
 Width of lands, 0.230 inch.
 Twist of rifling, 0 to 1° in 30 calibers.

4.72-INCH B. F. GUN (ARMSTRONG.)**50 CALIBERS.**

Weight, 8,160 pounds.
 Total length, 19.70 feet.
 Length of bore, 48.9 inches.
 Maximum diameter of breech, 15.56 inches.
 Diameter of muzzle, —.
 Diameter of trunnions, —.
 Distance between rimbases, —.
 Distance of axis of trunnions from muzzle, —.
 Powder chamber:
 Diameter, 4.90 inches.
 Length, 25.300 inches.
 Capacity, 496 cubic inches.
 Travel of projectile in bore, — calibers, 206.100 inches.
 Projectile:

	Kind.			
	C. I. shell.	Steel shell.	Strong head.	Shrapnel.
Weight, filled .....pounds..	45	45	45	45
Ratio of weight to weight of piece.....	177	177	177	177
Weight of bursting charge (rifle powder), pounds.....	1.2	4.5	2	.10
Length.....calibers..	3	5.6	8	a 2.8
Sectional density	2.57	2.57	2.57	2.57
Price without case, fuse, or bursting charge..	\$6.00	\$12.00		\$6.00
Price of cartridge case filled, service charge..	\$14.20			
Price of cartridge case separate.....	\$4.75			

a With fuse.

Powder:

Kind, black and smokeless (cordite).
 Weight, 13.60 pounds black; 8.20^b pounds smokeless.
 Density of loading, 0.7590 black; 0.4576 smokeless.

Muzzle velocity:

Black, 1,830 feet per second.
 Smokeless, 2,600 feet per second.

Maximum pressure per square inch, black and smokeless, 34,000 pounds.

Muzzle energy:

Black, 1,045 foot-tons.
 Smokeless, 2,109 foot-tons.

Terminal velocity:

Black, 1,473 feet per second at 1,000 yards; 846 feet per second at 5,000 yards.
 Smokeless, 2,116 feet per second at 1,000 yards; 1,030 feet per second at 5,000 yards.

a Spiral.

b Does not include igniting charge.

Rifling:

Number of grooves, 26.

Width, —.

Depth, 0.040 inch.

Width of lands, —.

Twist of rifling, one in 60 calibers to one in 30 calibers.

POWDER NOTE.—The weights of charge are approximate. The exact weight to give standard muzzle velocity is determined from the acceptance test and issue for charges.

**4.7-INCH R. F. GUNS (ARMSTRONG), 40, 45, AND 50 CALIBERS,
RESPECTIVELY.**

The breech mechanism for these three guns is identical.

For electric-firing gear, including attachment to retracting toe of firing pin and to recoil band, see list of parts of the mounts for these guns.

The designation, "One 4.7-inch R. F. gun (Armstrong), 40 (45 or 50) calibers," in correspondence, receipts, invoices, requisitions, etc., includes the gun proper with its attached parts and breech mechanism complete.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Block carrier, complete:					
Hinge pin, complete—					
Hinge pin	1	Steel....	Hinge-block carrier to recoil band shrunk on gun.	Interchangeable ...	Carrier hinge-bolt axis pin.
Hinge-pin oil-hole screw.	1	....do...	In upper end hinge pin	....do.....	
Hinge-pin washer	1	....do...	On lower end hinge pin.	....do.....	
Hinge-pin split pin.	1	....do...	Through lower end hinge pin.	....do.....	Keep pin for carrier-hinge bolt.
Block-carrier hinge washer.	1	Bronze.	About hinge pin; under hub of block carrier.	....do.....	
Block carrier	1	....do...	Hinged to breech of gun; supports breech-block.	....do.....	Breech-screw carrier.
Hinge key	1	Steel....	In hinge hole of block carrier. A part of block carrier.	Not removable from block carrier.	
Operating-lever pivot.	1	....do...	In block carrier near hinge. A part of block carrier.	....do.....	Hand-lever hinge-pin axis pin for lever.
Operating lever-pivot spline.	1	....do...	....do.....	....do.....	
Obturator lever-pivot oil-hole screw.	1	....do...	In block carrier above operating lever pivot.	Interchangeable ...	
Obturator lever-pivot nut.	1	....do...	On lower end operating-lever pivot.	....do.....	Nut for hand lever.
Obturator lever-pivot split pin.	1	....do...	Through lower end operating lever-pivot nut.	....do.....	Keep pin for hand lever.
Hinge oil-hole screw.	1	....do...	In block carrier near hinge hole.	....do.....	
Sliding block oil-hole screw.	1	....do...	In block carrier above way for sliding block.	....do.....	
Firing-cable ring pin	1	Bronze.	In block carrier, right rear corner.	....do.....	
Sliding block, complete—					
Sliding block	1	Steel....	In transverse way in lower part block carrier.	"Sliding block, complete," interchangeable.	
Rotating-pin bushing.	1	Bronze.	Slides vertically in sliding block. Surrounds rotating pin.	Interchangeable ...	Traversing bushing for sliding block.

^a Spiral.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shop, etc.
Block carrier complete—Cont'd.					
Sliding block complete—Cont'd.					
Sliding-block pivot.	1	Steel....	Connects right end of sliding block to operating link.	Not issued apart from sliding block.	
Sliding-block pivot-spline screw.	1	....do....	Secures pivot in sliding block.	Interchangeable ...	
Either—					
Block latch, complete—					
Block-latch housing.	1	Bronze .	Dovetailed and screwed to left end block carrier.	....do	Catch retaining breech screw open.
Block-latch bolt.	1	Steel....	In block-latch housing. Engages notch in breechblock.	....do	
Block-latch bolt stop.	1	....do....	Through housing into block-latch bolt.	....do	
Block-latch screws.	4	....do....	Secure block-latch housing to block carrier.	....do	
Block-latch spring	1	....do....	In block latch behind bolt.	....do	
Or—					
Carrier latch, complete—					
Breechblock, complete:					
Breechblock	1	....do....	In breech recess of gun.	....do	Breech screw.
(Rotating pin)	1	....do....	Screwed and riveted into rear end breechblock; a part of breechblock.	Not removable	
Breechblock oil-hole screw.	1	....do....	In breechblock near block stop.	Interchangeable ...	
Block stop—					
Block stop proper.	1	....do....	Through breechblock into block carrier. Block stop issued entire only.	....do	Screw-fixing breech-screw stop bolt.
Block-stop screw.	1	....do....			
Block-stop connector.	1	....do....			
Block-stop pin....	1	....do....			
Operating lever, complete:					
Operating lever	1	....do....	Pivoted to block carrier.	....do	Hand-locking lever.
Operating-lever spindle.	1	....do....	Through sleeve; screwed and riveted into operating lever; part of lever.	Not removable	
Obturator-lever sleeve.	1	Bronze .	A part of operating lever.	....do	
Safety guide plate..	1	Steel....	Screwed to operating lever.	Interchangeable ...	
Safety guide-plate screws.	4	....do....	On operating lever ....	....do	
Operating link, complete:					
Operating link	1	....do....	Connects operating lever to sliding block. (Link and pivot in one piece.)	....do	
Operating-link nut.	1	....do....	On pivot on operating link; secures it to operating lever.	....do	
Operating-link split pin.	1	....do....	Through pivot on operating link and nut.	....do	
Operating-link oil-hole screw.	1	....do....	In operating link, over pivot.	....do	

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service shops, etc.
Firing pin, complete:					
Firing pin.....	1	Steel....	Through center of breechblock.	Interchangeable.	Needle.
Firing-pin insulation.	a1	Insulating material.	Separating firing pin from its sleeve.	.....do.....	Set of insulating washers.
Firing-pin sleeve...	1	Steel....	About firing pin.....	.....do.....	
Firing-pin spring...	1	.....do...	About firing-pin sleeve	.....do.....	
Firing-pin bushing...	1	.....do...	Rear of firing-pin spring; secured to block carrier by bayonet lock.	.....do.....	Retaining nut.
Sear, complete—					
Sear	1	.....do...	In firing-pin bushing, protruding inward.	.....do.....	
Lanyard ring.....	1	.....do...	In firing-pin bushing; has shaft screwed into.	.....do.....	Trigger.
Sear spring.....	1	.....do...	In firing-pin bushing, behind sear.	.....do.....	
Sear washer.....	1	.....do...	In firing-pin bushing, behind sear spring.	.....do.....	
Sear cap.....	1	.....do...	Screwed on firing-pin bushing, behind sear spring and washer.	.....do.....	
Retracting toe.....	1	.....do...	On firing-pin sleeve, near rear end.	.....do.....	
Firing-pin sleeve nut.	1	Bronze...	On firing-pin sleeve, behind retracting toe.	.....do.....	
Firing-pin sleeve cap.	1	.....do...	On firing-pin sleeve, covering rear end.	.....do.....	
Firing-pin nut.....	1	Steel....	On rear end firing pin, behind sleeve. (This nut has circular collar.)	.....do.....	
Firing-pin lock nut.	1	.....do...	On rear end firing pin, behind firing-pin nut. (Sample hexagonal.)	.....do.....	
Safety device, complete:					
Safety cam.....	1	.....do...	Upper end safety-cam spindle firing-pin nut. (Sample hexagonal.)	.....do.....	Pawl, lever.
Safety-cam spindle.	1	.....do...	Seated vertically in block carrier under firing pin.	.....do.....	
Safety-cam spring..	1	.....do...	About safety-cam spindle.	.....do.....	
Safety-cam screw...	1	.....do...	Secures cam to spindle.	.....do.....	

Striker, electric and percussion.
Safety stop.

PARTS ATTACHED TO GUN PROPER, BUT REMOVABLE.

Extractor, complete:					
Extractor shaft.....	1	Steel....	In seat right side gun near upper hinge lug.	Interchangeable ..	
Extractor bushing.	1	.....do...	About extractor. Screwed into gun.	.....do.....	Bushing retaining extractor.
Extractor screw....	1	.....do...	Through extractor lever into outer end extractor.	.....do.....	
Extractor lever.....	1	.....do...	On outer end extractor. Pivoted to upper end extractor lever;	.....do.....	
Extractor dog.....	1	.....do...	extends through recoil band to a lug cam on block carrier.	.....do.....	Bolt actuating extractor.
Extractor-dog pivot.	1	.....do...	Connects dog to lever.	.....do.....	
Extractor-dog pivot washer.	1	.....do...	On extractor-dog pivot outside of lever.	.....do.....	
Extractor-dog pivot split pin.	1	.....do...	Through extractor-dog pivot, outside washer.	.....do.....	Keep-pin for bolt-actuating extractor.
Extractor spring....	1	.....do...	In housing, lower end extractor lever. Behind thimble.	.....do.....	

a Set.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Extractor spring thimble.	1	Steel ...	In housing, on extractor lever; bears against gun.	Interchangeable ...	
Extractor spring nut.	1	....do ...	In housing, on extractor lever, behind spring.	....do	
Extractor oil hole plug.	1	....do ...	In gun body near extractor.	....do	
Plug.....	1	Bronze.	Filling (?) seat on top of breech of gun.	....do	

Price of gun (.40, .45, and .50 calibers) and mount, each, \$13,500.

SIGHTS.

The sights are attached to the gun cradle and are of the bar and drum pattern, consisting of—

No.	Part.	Material.	Price, each.
1	Carrier		
2	Bases		
2	Base T head bolts		
1	Sight bar		
1	Sight-bar rack		
1	Front sight		
1	Rear sight		
1	Worm wheel		
1	Worm-wheel pinion		
1	Drum		
1	Graduated crown ring for drum		
1	Upright blade for front sight		
1	Crosshead		
2	Crosshead screws		

Each sight is fitted with a set of electric-light fittings, consisting of—

Tangent sight fitting, containing—

- 1 lamp.
- 1 lamp holder.
- 1 ebony connection.

1 front sight fitting, containing—

- 1 lamp.
- 1 glass cone.
- 1 lamp holder.
- 1 ebony connection.

2 cables with plug connection.

1 set of O. K. dry cells (10 O. K. cells No. 4).

For full description of sights, see "Handbook of Sights for Cannon," published by Ordnance Department.

FUSES.

Fuses used with the 4.72-inch Armstrong R. F. guns are:

	Price each.
Time and percussion fuse for shrapnel (Armstrong make)	
Base percussion fuse for shell (Armstrong make)	

PRIMERS AND ADAPTERS.

The following primers and adapters are issued:

Percussion primer (Frankford Arsenal). For prices see page 352.

Adapter for percussion on primer (Frankford Arsenal). For prices see page 352.

Electric primer (Frankford Arsenal). For prices see page 352.

Adaptor for electric primer (Frankford Arsenal). For prices see page 352.

CLEANING MATERIAL.

For allowance of cleaning material, etc., per annum, see supply table, page 359 and 360.

SPARE PARTS FOR GUN.

The following spare parts are issued for 4.72-inch Armstrong R. F. guns:

Spare parts for 4.72-inch Armstrong gun.

Parts.		Allowance.		Price each.
American nomenclature.	English nomenclature.	No. per gun.	No. per post.	
Block carrier	Breech screw carrier	1		
	Coatings for greaser	1		
	Expanding tomplon	1		
Extractor	Extractor	1		
Cartridge case extractor	Hook for extracting cartridge case ..	1		
Extractor dog pivot split pin ..	Keep pins for axis pin of bolt actuat- ing extractor.	2		
Hinge pin split pin	Keep pins for carrier-hinge bolt ..	2		
Operating link split pin	Keep pins for link-actuating breech screw.	2		
Operating lever pivot split pin ..	Keep pins for nut of hand lever	2		
Firing pins	Needles	2		\$6.20
Operating link nut	Nuts for link, connecting	2		
Operating lever pivot nut	Nuts for hinge-pin hand lever	2		
Safety device, complete	Safety stops		1	25.50
Sets of insulating washers (3 to a set).	Sets of insulating washers, 3 per set, leather.	2		
Carrier latch springs	Springs for catch retaining breech screw open.	2		4.30
Extractor springs	Springs for extractor	2		
Safety cam springs	Springs for safety stop	2		.96
Firing pin springs	Springs for striker	2		.76
Sear springs	Springs for trigger	3		
Firing pins complete	Striker, electric and percussion, with trigger spring and retaining nut.		1	58.50
Sear with cap, spring, and washer.	Trigger, with cap, spring, and washer.	1		6.55
Block stop, complete	Screw fixing breech screw	1		
Oil-hole screws:				
For block-carrier slide oil hole.				
For breech-block oil hole				
For hinge-pin friction wash- er oil hole.			1	.25
For operating-lever pin oil hole.				
For connecting-link pin oil hole.				
For hinge-pin oil hole				

^a Sear \$1.75, sear cap \$0.50, sear spring \$2.25.

A set of spare parts as enumerated should always be kept on hand at post.

In ordering spare parts always give the name of maker, model, and number of gun for which parts are required.

SUBCALIBER TUBES.

One-pounder subcaliber tubes are issued for use with 4.72-inch Armstrong R. F. guns, one to each post having guns of this caliber mounted. The list of parts of tube and fixtures are as follows:

List of parts of subcaliber tube and fixtures.

- 1 gun.
- 1 expanding screw.
- 1 center support.
- 1 muzzle support.

ACCESSORIES AND SPARE PARTS FOR SUBCALIBER TUBE.

The following accessories and spare parts are furnished with each subcaliber tube for 4.72-inch R. F. gun, calibers 40, 45, and 50:

- 1 hand extractor.
- 1 handspike.
- 1 clamping screw-driver.
- 1 oil can.
- 1 bristle sponge and rod.
- 1 breech cover.
- 1 muzzle cover. } Or cover for entire tube.
- 1 dismounting pin.
- 1 clip extractor.
- 1 storage chest.

Spare part:

- 1 expanding screw.

Price of subcaliber tube complete with accessories, \$263.

SPARE PARTS FOR MOUNT FOR 4.72-INCH R. F. GUN.

The following spare parts for 4.72-inch R. F. pedestal mounts are issued to the service:

American nomenclature.	Parts (English nomenclature).	Allowance.		Price each.
		No. per carriage.	No. per post.	
	Set of springs, running out, with case and bolts complete.	1		
	Running-out spring			
	Running-out spring bolts			
	Piston rod, with nuts and pin complete.	1		
	Piston-rod nuts			
	Piston-rod pins			
	Plug, cylinder	1		
	Gland, piston rod, outer	1		
	Gland, piston rod, inner	1		
	Plug, air hole	1		
	Plug, drain hole	1		
	Plug, filling hole	1		
	Plug, tank-cleaning hole			
	Ram, controlling, complete	1		
	Valve key, with bolt			
	Valve-key bolt	1		
	Onp leathers, piston rod	8		
	Washers, leather, tank plug	8		
	Washers, leather, filling plug	8		
	Washers, leather, cylinder plug	8		
	Washers, leather, bolt for valve key	8		
	Handwheel for elevating gear, complete.		1	
	Handwheel handle (elevating gear)		1	
	Wood shoulder piece with india rubber tube.		1	
	Belleville spring washers for elevating gear.	2		
	Pin securing cap squares, with chain and eyebolt.	1		
	Balls, antifriction	3		
	Handwheel for training gear, complete.		1	
	Handwheel handle (training gear)		1	
	Belleville spring washers for clamp of training gear.	2		
	Bar and drum sight complete		1	
	Direct circuit cable with McNary key.		1	
	Cable with contact battery to pistol		1	
	Cable with contact pistol to cradle		1	
	Cable with contact cradle to gun		1	
	Electrical pistol with sounder		1	
	Battery complete (or O. K. dry cells)		1	

A complete set of these parts should be kept on hand at post.

TOOL CHEST FOR 4.72-INCH ARMSTRONG R. F. GUN MOUNT.

The contents of the tool chest for the 4.72-inch Armstrong R. F. gun are as follows:

No.	Articles.		Price, each.
	English nomenclature.	American nomenclature.	
1	Cleaner.....	.....	.....
1	Ejector.....	.....	.....
1	Expanding tomplon.....	.....	.....
1	Fuze key, base.....	.....	\$6.00
1	Fuze key, time.....	.....	4.75
1	Fuze pocket with strap.....	.....	1.53
1	Greaser.....	.....	.....
1	Hook for extracting cartridge case.....	Cartridge case extractor.....	7.50
1	Key for inserting primer.....	Key for inserting primer.....	8.75
1	Lanyard.....	.....	.75
1	Lengthening stave for cleaner, ejector, greaser, and tomplon.....	.....	1.33
1	Primer pocket with strap.....	.....	4.00
1	Rimer for cleaning adapter for percussion firing.....	Reamer for cleaning adapter for percus- sion firing.....	7.00
1	Wrench for dismantling breech-closing mechanism.....	Combined double wrench and screw- driver.....	3.50
1	Wrench for dismantling extractor.....	Combined tit wrench and screw-driver ..	.50
1	Lead hammer.....	.....	.75
1	Drift for removing carrier axis pin.....	.....	.50
1	Set of punches (3 per set): 7.25 inches long.....	.....	5.50
	5 inches long.....	.....	.50
	5.7 inches long.....	.....	.50
1	Key for removing primers.....	.....	2.00
1	Spring clip for brass cartridge.....	.....	4.00
1	Oil can, ½ pint.....	.....	4.00
1	Fuze-hole rimer, base.....	Fuze-hole reamer.....	.....
1	Fuze-hole rimer, time.....	Primer-hole reamer.....	.....
1	Lock and key for breech fittings.....	.....	.....
1	Wrench for seats of electrical contact.....	.....	6.00
1	Spanner for piston rod and nuts.....	Double spanner wrench (for plug tank, cleaning, and inner and outer glands).	10.00
1	Spanner for piston rod and glands.....	Combined socket wrench, key, and screw-driver (for controlling plunger and filling plug).....	5.00
1	Spanner for controlling ram.....	Triple screw-driver (for rear-compressor plate, arc elevating pins, etc.).....	6.50
1	Spanner for elevating arc screws.....	Combined screw-driver (for screws in protecting shield and for withdrawing split pin).....	4.00
1	Spanner for guard screws.....	Double wrench for plunger controlling and cradle lubricators.....	3.50
1	Spanner for cradle lubricators.....	Combined wrench and screw-driver (for sighting gear).....	4.50
1	Spanner for sighting gear.....	Cradle lifting eye with shackle pin and cotter.....	.....
1	Lifting eye for cradle with shackle and pin.....	Adjustable wrench, small.....	.....
1	Spanner, McMahon, 1½-inch jaw.....	Adjustable wrench, large.....	.....
1	Spanner, McMahon, 3-inch jaw.....	.....	5.50
1	Filling measure.....	Filling measures.....	45.00
1	Armament chest.....	.....	.....

6-INCH R. F. GUN (ARMSTRONG).

For full details as to care, preservation, etc., see pamphlets "Instructions for 6-inch quick-firing Armstrong gun," issued by Ordnance Department.

WEIGHTS, DIMENSIONS, ETC., OF 6-INCH R. F. GUN (ARMSTRONG), 40 CALIBERS.

Weight, 14,784 pounds.
 Total length, 20.77 feet.
 Length of bore, 40 calibers.
 Maximum diameter of breech, 22 inches.
 Diameter of muzzle, —.
 Diameter of trunnions, —.
 Length of trunnions, —.
 Distance between rimbases, —.
 Distance of axis of trunnions from muzzle, —.

Powder chamber:

Diameter, 6.2 inches.

Length, 22.6 inches.

Capacity, 678 cubic inches.

Travel of projectile in bore, — caliber, 216.7 inches.

Projectile:

Kind.	Cast-iron shell.	Cast-steel shell.	Strong head.	A. P. shot.	Shrapnel.
Weight filled.....pounds..	100	100	100	100	.....
Ratio of weight to weight of piece.....	ratio	ratio	ratio	ratio	.....
Weight of bursting charge (ride powder).....pounds..	4.75	9.8	4.9	2.9	.....
Length.....calibers..	8.4	8.6	8.2	8.54	.....
Sectional density.....	8.64	8.64	8.64	8.64	.....
Price without case, fuse, or bursting charge.....	\$8.60	.....	\$21.00	\$34.00	\$14.00
Price of cartridge case filled, service charge.....	\$21.70	.....	.....	.....	.....
Price of cartridge case separate.....	\$7.60	.....	.....	.....	.....

Powder:

Kind, smokeless.

Weight, 13.30 pounds.^a

Density of loading, 0.5430.

Muzzle velocity, smokeless, 2,150 feet per second.

Maximum pressure per square inch, smokeless, 34,000 pounds.

Muzzle energy, smokeless, 3,217 foot-tons.

Terminal velocity, smokeless, 1,850 feet per second at 1,000 yards; 1,055 feet per second at 5,000 yards.

Rifling:

Number of grooves, 24.

Width, —.

Depth, 0.060 inch.

Width of lands, —.

Twist of rifling, 0^b to 1 turn in 30 calibers.**6-INCH R. F. GUN (ARMSTRONG), 40 CALIBERS.**

(Called by the English "162 m/m. quick-fire Armstrong gun.")

For electric-firing gear, including attachments to retracting toe of firing pin and to recoil band, see list of parts of the mount for this gun.

The designation, "One 6-inch R. F. gun (Armstrong), 40 calibers," in correspondence, invoice, receipt, requisitions, etc., includes the gun proper, with its attached parts and breech mechanism, complete, as per list below:

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used by the manufacturers.
Block carrier, complete:					
Hinge pin.....	1	Steel....	Hinges block carrier to recoil band shrunk on gun.	Interchangeable ...	Carrier hinge bolt axis pin.
Hinge-pin oil-hole screw.	1	....do...	In upper end hinge pin.	.....do.....	
Block-carrier hinge washer.	1	Bronze ^a .	About hinge pin under hub of block carrier.	.....do.....	
Block carrier.....	1	....do...	Hinged to breech of gun. Supports breech block.	.....do.....	Breech-screw carrier.
Hinge key.....	1	Steel....	In hinge hole of block carrier. Part of block carrier.	Not removable	

^a Does not include igniting charge.^b Spiral.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used by the manufacturers.
Block carrier, complete—Continued.					
Operating-lever pivot.	1	Steel....	In block carrier near hinge. Part of block.	Not removable (riveted).	Hand-lever hinge pin, axis pin for lever.
Operating-lever pivot oil-hole screw.	1	....do...	In block carrier above operating-lever pivot.	Interchangeable...	
Operating-lever pivot nut.	1	....do...	On lower end operating-lever pivot.	....do.....	Nut for hand lever.
Operating-lever pivot split pin.	1	....do...	Through lower end operating-lever pivot.	....do.....	Keep pin for hand lever.
Hinge oil-hole screw.	1	....do...	In block carrier near hinge hole.	....do.....	
Firing-cable ring pin.	1	Bronze..	In block carrier, right rear corner.	....do.....	
Sliding-block oil-hole screw.	1	Steel....	In block carrier, above way for sliding block.	....do.....	
Safety-spindle stop.	1	....do...	On block carrier underneath sliding-block slot. Part of block carrier.	Not removable....	
Safety-spindle stop rivets.	2	....do...	Underneath sliding-block slot. Part of block carrier.	....do.....	
Sliding block, complete—					
Sliding block....	1	....do...	In transverse way in lower part block carrier.	Interchangeable...	
Sliding-block pivot.	1	....do...	In sliding block. Secured by spline screw.	Not interchangeable.	
Sliding-block pivot spline screw.	1	....do...	In sliding block and sliding-block pivot.	Interchangeable...	
Rotating-pin bushing.	1	Bronze..	Slides vertically in sliding block. Surrounds rotating pin.	....do.....	Traversing bush for sliding block.
Block latch, complete.					
Block-latch housing.	1	....do...	Dovetailed and screwed to left end block carrier.	....do.....	
Block-latch screws.	4	Steel....	In left end block carrier.	....do.....	
Block-latch bolt..	1	....do...	In block-latch housing.	....do.....	Catch retaining breech screw open.
Block-latch stop..	1	....do...	Through block-latch housing into latch bolt.	....do.....	
Block-latch spring.	1	....do...	In block-latch housing.	....do.....	
Or—					
Carrier latch, complete.					

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used by the manufacturers.
Breechblock, complete:					
Breechblock	1	Steel...	In breech recess of gun.	Interchangeable ...	Breech screw.
(Rotating pin)	1	....do...	Screwed and riveted into rear-end breechblock. A part of breechblock.	Not removable	
Breechblock oil-hole screw.	1	....do...	In breechblock near block stop.	Interchangeable ...	
Block stop—					
Block-stop proper.	1	....do...	Through breechblock into block carrier. Block stop lamed entire, only.	....do	{ Screw fixing breech screw, stop bolt.
Block-stop screw.	1	....do...			
Block-stop connector.	1	....do...			
Block-stop pin....	1	....do...			
Operating lever, complete:					
Operating lever	1	....do...	Pivoted to block carrier.	....do	Hand-locking lever.
Operating-lever spindle.	1	....do...	Screwed and riveted to operating lever. Part of lever.	Not removable	
Operating-lever sleeve.	1	Bronze.	On operating-lever spindle. Part of lever.	....do	
Safety guide plate..	1	Steel....	Screwed to operating lever.	Interchangeable ...	
Safety guide-plate screws.	4	....do...	On operating lever...	....do	
Operating link, complete:					
Operating link	1	....do...	Connects operating lever with sliding block.	....do	
Operating-link nut.	1	....do...	On pivot of operating link.	....do	
Operating-link split pin.	1	....do...	Through pivot of operating link.	....do	
Operating-link oil-hole screw.	1	....do...	In operating link opposite pivot.	....do	
Firing pin, complete:					
Firing pin	1	....do...	Through center of breechblock.	....do	Needle
Firing-pin insulation.	a1	Insulating material.	Separates firing pin from its sleeve.	....do	Set of insulating washers.
Firing-pin sleeve...	1	Steel....	About firing pin .....	....do	
Firing-pin spring...	1	....do...	About firing-pin sleeve	....do	
Firing-pin bushing.	1	....do...	Rear of firing-pin spring, secured to block carrier by bayonet lock.	....do	Retaining nut
Sear, complete—					
Sear	1	....do...	In firing-pin bushing, protruding inward.	....do	} Trigger
Lanyard ring	1	....do...	Screwed and pinned on outer end of shaft of sear.	....do	
Lanyard-ring pin.	1	....do...	Through sear shaft and lanyard ring.	....do	
Sear spring	1	....do...	About shaft of sear behind its head.	....do	
Sear washer	1	....do...	Behind sear spring in firing-pin bushing.	....do	
Sear cap	1	....do...	Screwed on firing-pin bushing behind sear and spring.	....do	
Retracting toe.....	1	....do...	On firing-pin sleeve near rear end.	....do	
Firing-pin sleeve nut.	1	Bronze.	On firing-pin sleeve behind retracting toe.	....do	
Firing-pin sleeve cap.	1	Steel or bronze.	On firing-pin sleeve, covering rear end.	....do	
Firing-pin nut.....	1	Steel....	On rear end firing pin behind sleeve. Has circular collar.	....do	
Firing-pin lock nut.	1	....do...	On rear end firing pin behind firing-pin nut. Plain hexagonal.	....do	

Barker, electric and percussion.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used by the manufacturers.
Safety device, complete:					
Safety cam	1	Steel...	Upper end safety-cam spindle. Retracts firing pin by retracting toe.	Interchangeable....	Pawl, lever....
Safety-cam spindle.	1	...do...	Seated vertically in block carrier under firing pin.	....do.....	
Safety-cam spring..	1	...do...	About safety-cam spindle.	....do.....	
Safety-cam screw...	1	...do...	Secures cam to spindle.	....do.....	

Safety stop.

PARTS ATTACHED TO GUN PROPER, BUT REMOVABLE.

Loading tray, complete:					
Loading-tray—					
Loading-tray body.	1	Bronze.	Pivoted to breech of gun. Raised by cam on block carrier. Part of loading tray.	Interchangeable.	Interchangeable.
Loading-tray toe..	1	Steel...	On and part of loading tray. Works in block-carrier cam. Part of loading tray.	Not removable from loading tray.	
Loading-tray pivot.	1	....do...	Fastens loading tray to gun.	Interchangeable....	
Loading-tray washer.	1	....do...	On loading-tray pivot..	....do.....	
Loading-tray split pin.	1	....do...	Through loading-tray pivot.	....do.....	
Loading-tray guide bolt.	1	....do...	In breech of gun. Head in slot in loading tray.	....do.....	
Extractor, complete:					
Extractor shaft....	1	....do...	In seat right side gun near upper hinge lug.	....do.....	
Extractor bushing.	1	....do...	About extractor. Screwed into gun.	....do.....	Bushing retaining extractor.
Extractor screw....	1	....do...	Through extractor lever into outer end of extractor.	....do.....	
Extractor lever....	1	....do...	On outer end of extractor.	....do.....	
Extractor dog	1	....do...	Pivoted to upper end of extractor lever; extends through recoil band to a lug cam on block carrier.	....do.....	Bolt actuating extractor.
Extractor-dog pivot.	1	....do...	Connects dog to lever.	....do.....	
Extractor-dog pivot washer.	1	....do...	On extractor-dog pivot outside of lever.	....do.....	
Extractor-dog pivot split pin.	1	....do...	Through extractor-dog pivot, outside washer.	....do.....	Keep-pin for bolt actuating extractor.
Extractor spring ...	1	....do...	In housing, lower end of extractor lever. Behind thimble.	....do.....	
Extractor spring thimble.	1	....do...	In housing, on extractor lever; bears against gun.	....do.....	
Extractor spring nut.	1	....do...	In housing, on extractor lever, behind spring.	....do.....	
Extractor oil hole plug.	1	....do...	In gun body near extractor.	....do.....	
Plug	1	Bronze.	Filling (?) seat on top of breech of gun.	....do.....	
(???) Oil-hole screws.	(?)	(?)	In gun body (?)	....do.....	

Price of gun and mount, complete, \$23,508.26.

SIGHTS.

The sights are attached to the gun cradle and are of the bar and drum pattern, consisting of—

No.	Part.	Material.	Price, each.
1	Carrier		
2	Bases		
2	Base T-head bolts		
1	Sight bar		
1	Sight-bar rack		
1	Front sight		
1	Rear sight		
1	Worm wheel		
1	Worm-wheel pinion		
1	Drum		
1	Graduated crown ring for drum		
1	Upright blade for front sight		
1	Crosshead		
2	Crosshead screws		

Each sight is fitted with a set of electric light fittings, consisting of—

Tangent sight fitting, containing—

- 1 lamp.
- 1 lamp holder.
- 1 ebony connection.

1 front sight fitting, containing—

- 1 lamp.
- 1 glass cone.
- 1 lamp holder.
- 1 ebony connection.

2 cables with plug connections.

1 set of O. K. dry cells (10 O. K. cells No. 4).

For full description of sights see "Handbook of Sights for Cannon," published by Ordnance Department.

FUSES.

Fuses used with 6-inch Armstrong R. F. guns are:

Direct-action percussion fuse, for cast-steel shell.

Base percussion fuse, for C. I. and strong-headed shell.

PRIMERS AND ADAPTERS.

The following primers and adapters are used:

- | | |
|--|-----------------------------|
| Percussion primer (Frankford Arsenal). | } For prices, see page 352. |
| Adapter for percussion primer (Frankford Arsenal). | |
| Electric primer (Frankford Arsenal). | |
| Adapter for electric primer (Frankford Arsenal). | |

CLEANING MATERIAL.

For allowance of cleaning material, etc., per annum, see supply table, pages 359 and 360.

SPARE PARTS FOR GUN.

The following spare parts are issued for 6-inch Armstrong R. F. guns:

Spare parts for 6-inch Armstrong gun.

American nomenclature.	English nomenclature.	Allowance.		Price, each.
		No. per gun.	No. per post.	
Block carrier	Breech screw carrier	1		
	Coating for greaser	1		
	Expanding tomplon	1		
Extractor	Extractor	1		
Cartridge case extractor	Hook for extracting cartridge case ..	1		
Extractor dog pivot split pin ..	Keep pins for axis pin bolt actuating extractor.	2		
	Keep pins for axis pin of shot guide.	2		
Hinge pin split pin	Keep pin for carrier hinge bolt	2		
	Keep pins for extractor lever	2		
Operating link split pin	Keep pins for link actuating breech screw.	2		
Operating lever pivot split pin..	Keep pins for nut for hand lever.....	2		
Firing pins	Needles	2		6.50
Operating link nut	Nuts for link connection	2		
Operating lever pivot nut	Nuts for hinge pin hand lever	2		
Safety device complete	Safety stops		1	20.00
Insulating washers (sets of 3 to a set).	Washers, leather (sets of 3 per set) ..	2		
Carrier latch springs.....	Springs for catch retaining breech screw, open.	2		
Safety cam spring	Springs for safety stops	2		.00
Firing pin springs	Springs for strikers	2		.60
Sear springs.....	Springs for triggers.....	4		
Firing pins complete	Striker, electric and percussion, with trigger, spring, and retaining nut.		1	50.00
Sear with cap spring and washer.	Trigger with cap spring and washer.	1		
Block stop, complete	Screw fixing breech screw	1		
Extractor springs	Springs for extractor	2		
Oil-hole screws:				
For block-carrier alide oil hole.				
For breechblock oil hole.....				
For hinge-pin friction washer oil hole.				
For operating-lever pin oil hole.		1		.25
For connecting-link pin oil hole.				
For hinge-pin oil hole.....				

A set of spare parts as enumerated should always be kept on hand at post.

In ordering spare parts always give the name of maker, model, and number of gun for which parts are required.

SUBCALIBER TUBE.

One-pounder subcaliber tubes are issued for use with 6-inch Armstrong R. F. guns, one to each post having guns of this caliber mounted.

List of parts of subcaliber tubes and fixtures.

- 1 gun.
- 1 expanding screw.
- 1 center support.
- 1 muzzle support.

ACCESSORIES AND SPARE PARTS OF SUBCALIBER TUBE.

The following accessories and spare parts are furnished with each subcaliber tube for 6-inch Armstrong R. F. gun:

- 1 hand extractor.
- 1 handspike.
- 1 clamping screw-driver.
- 1 oil can.
- 1 bristle sponge and rod.
- 1 breech cover } Or cover for entire tube.
- 1 muzzle cover }
- 1 dismounting pin.
- 1 clip extractor.
- 1 storage chest.

Spare part:

- 1 expanding screw.

Price of subcaliber tube complete with accessories, \$300.

SPARE PARTS FOR MOUNT FOR 6-INCH R. F. GUN (ARMSTRONG).

The following spare parts for 6-inch R. F. (Armstrong) pedestal mounts are issued to the service:

American nomenclature.	Parts (English nomenclature).	Allowance.		Price, each.
		No. per carriage.	No. per post.	
	Set of springs, running out, with case and bolts complete.....	1	.....	.....
	Running-out spring, case.....	.....	.....	.....
	Running-out spring.....	.....	.....	.....
	Running-out spring, bolts.....	.....	.....	.....
	Piston rod, with nut and pin complete.....	1	.....	.....
	Piston-rod nut.....	.....	.....	.....
	Piston-rod pin.....	.....	.....	.....
	Plug, cylinder.....	1	.....	.....
	Gland, piston rod, outer.....	1	.....	.....
	Gland, piston rod, inner.....	1	.....	.....
	Plugs, air hole.....	2	.....	.....
	Plugs, filling hole.....	2	.....	.....
	Plugs, drain hole.....	2	.....	.....
	Plugs, tank-cleaning hole.....	1	.....	.....
	Ram, controlling, complete.....	1	.....	.....
	Valve key, with bolt.....	1	.....	.....
	Washers, leather, tank plug.....	3	.....	.....
	Washers, leather, cylinder plug.....	3	.....	.....
	Washers, leather, bolt for valve key.....	3	.....	.....
	Washers, leather, plug drain cylinder.....	3	.....	.....
	Washers, leather, controlling ram.....	3	.....	.....
	Cup leathers, piston rod.....	3	.....	.....
	Handwheel with handle for elevating gear.....	.....	1	.....
	Handwheel handle for elevating gear.....	.....	1	.....
	Wood shoulder piece with I. R. tube.....	1	1	.....
	Belleville spring washers for elevating gear.....	2	1	.....
	Balls, antifriction.....	3	1	.....
	Handwheel, with handle for training gear.....	.....	1	.....
	Handwheel handle for training gear.....	.....	1	.....
	Belleville spring washers for clamp.....	2	.....	.....
	Bar and drum sight, complete.....	.....	1	.....
	Direct circuit cable with McEvoy key.....	.....	1	.....
	Electrical pistol, complete, with sounder.....	.....	1	.....
	Cable with contacts, battery to pistol.....	.....	1	.....
	Cable with contacts, pistol to cradle.....	.....	1	.....
	Cable with contacts, cradle to gun.....	.....	1	.....
	Battery complete (O. K. dry cells).....	.....	1	.....

A complete set of these parts should be kept on hand at post.

Tool chest of 6-inch Armstrong R. F. gun and mount.

No.	Articles.		Price each.
	English nomenclature.	American nomenclature.	
1	Cleaner.....	.....	.....
1	Ejector.....	.....	.....
1	Expanding tomplon.....	.....	.....
1	Fuse key, base.....	.....	\$6.00
1	Fuse key, time.....	.....	4.75
1	Fuse pocket with strap.....	.....	1.33
1	Greaser.....	.....	2.75
1	Hook for extracting cartridge case.....	Cartridge-case extractor.....	7.50
1	Key for inserting primer.....	Key for inserting primer.....	3.50
1	Lanyard.....	.....	.75
1	Lengthening stove for cleaner, ejector, greaser, and tomplon.....	.....	.....
1	Primer pocket with strap.....	.....	1.33
1	Rimer for cleaning adaptor for percussion firing.....	Reamer for cleaning adaptor for percussion firing.....	4.00
1	Wrench for dismantling breech-closing mechanism.....	Combined double wrench and screw-driver.....	7.00
1	Wrench for dismantling extractor.....	Combined tit wrench and screw-driver.....	5.00
1	Lead hammer.....	.....	.....
1	Drift for removing carrier axis pin.....	.....	.50
1	Set of punches (3 per set).....	Drifts, steel (3 per set).....	.....
	7.25 inches long.....	.....	.75
	6 inches long.....	.....	.50
	2.7 inches long.....	.....	.50
1	Screw-driver.....	.....	3.00
1	Key for removing primer.....	.....	5.50
1	Spring clip for brass cartridges.....	Cartridge-case clip.....	4.50
1	Oil can (1 pint).....	.....	2.50
1	Lock and key for breech fittings.....	.....	.....
1	Fuse-hole rimer, base.....	.....	4.00
1	Fuse-hole rimer, time.....	.....	4.00
1	Spanner for piston-rod glands.....	Double spanner wrench for plug-tank cleaning and inner and outer glands.....	10.00
1	Spanner for controlling ram, etc.....	Combined socket wrench key and screw-driver (for controlling plunger and filling plug).....	2.75
1	Spanner for elevating arc screws.....	Triple screw-driver.....	6.50
1	Spanner for nut-compressing running-out springs.....	Tit wrench.....	3.50
1	Spanner for nut running-out rod.....	Single wrench (running-out rods).....	3.50
1	Spanner for air and drain plugs.....	Combined wrench and screw-driver (for sighting gear).....	4.50
1	Spanner for sighting gear.....	.....	.....
1	Forcing screw, removing bottom-bearing ring.....	.....	.....
1	Forcing screw for trunnion bearing.....	.....	.....
1	Lifting eye for cradle with shackles and pins.....	Cradle lifting eye with shackle pin and cotter.....	17.00
1	Spanner, McMahon, 2½-inch jaws.....	Adjustable wrench, 2½-inch.....	22.44
1	Spanner, McMahon, 4-inch jaws.....	Adjustable wrench, 4-inch.....	23.56
1	Filling measure (1 gallon).....	Filling measure.....	3.50
1	Tool chest.....	.....	25.00

NIGHT SIGHTS FOR 4.72 AND 6 INCH ARMSTRONG R. F. GUNS.

There are issued for each 4.72 and 6 inch Armstrong R. F. gun one set of night sights.

A set of night sights for either gun is composed of the following articles:

	Price each.	
	4.72-inch.	6-inch.
1 battery box.....
1 battery complete (10 O. K. dry cells).....
1 front-sight bracket.....
1 front-sight socket.....
1 breech sight.....
3 cables with terminals.....
4 micro lamps, clear.....
4 micro lamps, ruby.....

The following spare parts for night sights are issued:

	Allowance per post.
Battery complete (10 O. K. dry cells) (price 30 cents per cell)	1
Cables with terminals.....	2
Micro lamps, clear	4
Micro lamps, ruby	4

A complete set of these parts should always be kept on hand at post equipped with these guns.

CARTRIDGE CASES FOR 4.72 AND 6 INCH ARMSTRONG R. F. GUNS.

Cartridge cases for 4.72 and 6 inch Armstrong R. F. guns after being fired should be taken up on returns as "Empty cartridge cases," under proper heading. Such cases as may require re-forming should (when a sufficient quantity have accumulated to warrant shipment) be shipped to Frankford Arsenal to be re-formed. Re-forming will not be done at the post.

DECAPPING TOOLS.

There are issued to each post equipped with either 4.72 or 6 inch Armstrong guns one set of decapping tools. These sets are termed "Decapping set for 4.72 and 6 inch Armstrong guns," and are composed of the following:

	Price each.
4.72-inch R. F. case:	
1 bronze capping and decapping anvil ^a	\$3.50
1 bronze decapping guide.....	1.75
1 steel decapping spindle, long} assembled {	1.45
1 steel capping spindle, short.....	.87
Total	7.07
4.72-inch and 6-inch Armstrong R. F. case:	
1 bronze capping and decapping anvil ^b	6.50
1 bronze decapping guide.....	1.75
1 steel decapping spindle, long} assembled {	1.45
1 steel capping spindle, short.....	.87
Total	10.07

^a Recessed, one side for capping, the other for decapping.

^b Double recessed, one side for capping, the other for decapping, both sides.

There are also issued to each post equipped with 4.72 and 6 inch Armstrong rapid-fire guns one set of tools for decapping and cleaning 1-pounder subcaliber ammunition. These sets are termed "Decapping and cleaning sets for 1-pounder subcaliber ammunition," and are composed of the following:

	Price each.
1 decapping spindle	\$.....
1 decapping anvil .....	.....
1 cleaning brush .....	.....
Total	2.50

RE-FORMING TOOLS FOR 4.72-INCH R. F. GUNS.

The following constitute a set of re-forming tools for 4.72-inch (Armstrong) R. F. gun:

- 1 stand, with die.
- 1 hand wheel.
- 1 gauge.
- 1 mandrel block.
- 1 mallet.
- 1 capper set.
- 1 key for inserting primers.
- 1 spring clip and link.
- 2 rammers for primer hole.
- 1 key for removing primers.
- 1 hammer.
- 1 lever and weights.

These sets are not issued to the service. Cartridge cases when needing re-forming will be shipped to Frankford Arsenal for that purpose upon proper authority being first obtained.

SIX-POUNDER R. F. GUNS AND MOUNTS.

(For more complete description of guns and mounts and instructions for mounting, using, and caring for same, see pamphlet Instructions for Mounting, Using, and Caring for 6-Pounder R. F. Guns and Rampart Mounts, issued by the Ordnance Department.)

The 6-pounder R. F. guns and mounts at present in service are either of the Driggs-Seabury or American Ordnance Company design and manufacture, the former being of two models, to wit, 1898 and 1900, and the latter being what is known as the Driggs-Schroeder (Mark III) gun. Ten of the Driggs-Schroeder (Mark II) guns were purchased and delivered to the service, but later sold to the Quartermaster's Department and transferred to transports.

The carriages for the first 10 guns purchased (Driggs-Schroeder Mark II) were of the American Ordnance Company design and manufacture. All the remaining mounts are the Driggs-Seabury Company design and manufacture.

There were 20 of the model 1898 Driggs-Seabury guns purchased, numbered from 1 to 20, and 40 of the model 1900 mounts, numbered from 21 to 60, both inclusive. Of the first 20, 17 were issued to the transports, to wit, Nos. 2, 3, 4, 5, 6, 8, 9, 10, 13, 14, 15, 16, 18, and 20. None of the carriages of either the American Ordnance Company design and manufacture or the Driggs-Seabury design and manufacture were issued with the guns to transports.

The 10 American Ordnance Company (Driggs-Schroeder Mark II) guns and the 17 Driggs-Seabury guns (model 1898) issued to the transport service were replaced by 27 American Ordnance Company (Mark III) guns, numbered from 8 to 34, both inclusive.

DRIGGS-SEABURY GUNS, MODEL 1898.

The Driggs-Seabury gun, model 1898, is provided with a drop-block breech mechanism consisting of the following principal parts:

- Breechblock.
- Operating shaft.
- Cam sleeve.
- Locking spring.
- Extractor.
- Operating handle.

Firing pin.
 Firing spring.
 Firing pawl.
 Bracket bearing.
 Bracket-locking spring.
 Trigger.
 Trigger spring.

The principal weights, dimensions, etc., of the model 1898 gun are as follows.

Weight of gun with breech mechanism, 850 pounds.
 Total length, 118.12 inches.
 Length of bore, 112.12 inches.
 Exterior diameter over powder chamber, 8.3 inches.
 Travel of shot, 101.759 inches.

Rifling:

Number of grooves, 18.
 Width of grooves, 0.22 inch.
 Depth of grooves, 0.022 inch.
 Width of lands, 0.1717 inch.
 Diameter between lands, 2.244 inches.
 Twist of rifling, right hand, from 0 to 1 turn in 28.8 calibers at muzzle.

Powder charge:

Kind of powder, smokeless.
 Weight of charge, 20 ounces.
 Density of loading for 20-ounce charge, 0.707.

Projectile:

Weight (filled), 6 pounds.
 Ratio of weight to that of piece, 1 to 141½.
 Sectional density, $\frac{W}{d^2} = 1.19$.
 Muzzle velocity, 2,400 foot-seconds.
 Maximum pressure per square inch, 33,600 pounds.
 Muzzle energy, 239.5 foot-tons.
 Penetration in steel at muzzle, 3.39 inches.

Forgings:

Weight of tube, 430 pounds.
 Weight of jacket, 415 pounds.
 Weight of hoop, 190 pounds.
 Total weight, 1,035 pounds.

The rifling of guns from 1 to 6, inclusive, has 24 grooves 0.012 inch deep and 0.22 inch wide, the lands being 0.0737 inch wide.

Price of gun and mount (Nos. 1 to 20) complete, \$2,400.

Price of ammunition per round: C. I. shell, \$3.84; steel shell, \$4.25.

SIGHTS.

Front sight.—The front sight consists of a bracket and cross-wire frame, the latter carrying two wires, and is assembled in a socket of the former by stud and set screw.

Rear sight.—The rear sight consists of a bracket, an operating knob, a pinion with a sleeve, a standard, a cross arm and screw, and a cross-wire frame.

The bracket is slotted for the standard and at right angles to the pinion and sleeve. The sleeve and knob are assembled to the pinion and are held in place by the pinion wheel and a spring that abuts against the shoulder in the knob and a collar fastened at the outer end of the pinion. The sleeve is assembled to the bracket by a set screw and has a serrated surface that fits a corresponding surface on the knob, thus preventing rotation of the latter.

The knob is ordinarily held against the sleeve by the spring, but may be moved along the pinion and then rotated. The spline on the pinion has a corresponding groove in the knob, causing them to rotate together. The standard is shaped to the slot in the bracket, has ranges marked on its surface, and carries a rack that engages the pinion. The cross arm is assembled to the pinion by a stud and pin, is shaped to receive the base of the cross-wire frame, has two bearings for the screw, and is graduated to mark deflections. The cross-wire frame carries four wires arranged to give a small, clear aperture in the center. The lower part has a zero line, is made to fit in the cross arm, and is threaded for the screw. This last is fixed in position and when rotated causes the cross wire to move to right or left.

SPARE PARTS.

The following spare parts are issued with the model 1898 gun and carried in the accessory box of the carriage:

	Price each.
1 firing mechanism, complete (consisting of 1 firing pin, 1 firing-pin spring, 1 bracket-bearing trigger and pawl)	
2 main springs	
1 firing pin	\$18.40
1 locking spring	

DRIGGS-SEABURY GUN, MODEL 1900.

The Driggs-Seabury 6-pounder R. F. gun, model 1900, is fitted with a cylindrical interrupted screw type of breech mechanism, consisting of the following principal parts:

	Price each.		Price each.
Breechblock		Operating lever	
Safety screw pin		Extractor	\$18.00
Carrier plate		Firing-pin body	
Carrier-plate ring		Firing-pin head	
Carrier-plate ring screws (2)	\$0.35	Firing-pin head securing pin	
Lever-catch plunger		Pawl	
Lever-catch plunger spring		Pawl pivot	
Plunger cotter		Firing spring	
Hinge pin	1.25	Trigger	4.75
Lever pin .....	.35	Trigger spring .....	.40
Lever-pin cotter pin		Trigger-pivot pin	
Locking bolt	2.50	Lanyard button	
Locking-bolt spring	1.75		

The principal weights, dimensions, etc., of the model 1900 gun are as follows:

Weight of gun with breech mechanism, 845 pounds.

Total length, 118.12 inches.

Length of bore, 112.12 inches.

Exterior diameter over powder chamber, 8.3 inches.

Travel of shot, 101.759 inches.

Rifling:

Number of grooves, 18.

Width of grooves, 0.22 inch.

Depth of grooves, 0.022 inch.

Width of lands, 0.1717 inch.

Diameter between lands, 2.244 inches.

Twist of rifling, right hand, from 0 to 1 turn in 28.8 calibers at muzzle.

Powder charge:

Kind of powder, smokeless.

Weight of charge, 20 ounces.

Density of loading, for 20-ounce charge, 0.707.

Projectile:

- Weight (filled), 6 pounds.
- Ratio of weight to that of piece, 1 to 140.8.
- Sectional density, $\frac{W}{d}=1.19$.
- Muzzle velocity, 2,400 foot-seconds.
- Maximum pressure per square inch, 33,600 pounds.
- Muzzle energy, 239.5 foot-tons.
- Penetration in steel at muzzle, 3.39 inches.

Forgings:

- Weight of tube, 430 pounds.
- Weight of jacket, 383 pounds.
- Weight of hoop, 190 pounds.
- Total weight, 1,003 pounds.
- Price of gun (Nos. 21 to 60), \$848.

SIGHTS.

The sights issued with this gun are the same as those for the model 1898 gun, and the parts and their nomenclature are identical.

SPARE PARTS.

The following spare parts are issued with this model gun and carried in the accessory box supplied with each carriage:

	Price each.
2 mainsprings.....	
1 firing pin with pawl.....	
1 extractor.....	
1 firing-pin head (assembled on firing pin).....	
1 block-locking spring.....	

AMERICAN ORDNANCE COMPANY (DRIGGS-SCHROEDER) 6-POUNDER GUN, MODEL MARK II.

The breech mechanism of Mark II gun is composed of the following:

- 1 breech block.
- 1 vent plate.
- 1 cam.
- 1 firing-pin body.
- 1 firing-pin head.
- 1 firing spring.
- 1 sear.
- 1 sear spring.
- 1 drill washer.
- 1 drill-washer support.
- 1 main bolt.
- 1 operating handle.
- 1 handle-locking spring.
- 2 guide bolts.
- 2 extractors.
- 1 tray.
- 2 tray screws.
- 1 lever-stop pin.

The principal weights, dimensions, etc., of the Mark II gun are as follows:

Weight of gun, 791 pounds.

Total length, 118.55 inches.

Length of bore, 112.2 inches.

Exterior diameter over chamber, 8.3 inches.

Travel of shot, 101.840 inches.

Rifling:

Number of grooves, 18.

Width of grooves, 0.22 inch.

Depth of grooves, 0.022 inch.

Width of land, 0.1717 inch.

Diameter between lands, 2.244 inches.

Twist of rifling, right hand, from 0 to 1 turn in 26.36 calibers at muzzle.

Powder charge:

Kind of powder, smokeless.

Weight of charge, 20 ounces.

Density of loading, for 20-ounce charge, 0.6920.

Projectiles:

Weight (filled), 6 pounds.

Ratio of weight to that of piece, $\frac{1}{11}$.

Sectional density, 1.53.

Muzzle velocity, 2400 f. s.

Maximum pressure per square inch, 34,000 pounds per square inch.

Muzzle energy, 255 foot tons.

Penetration in steel at muzzle, 5.37 inches.

1,000 yards, 3.37 inches. } Tempered uncapped steel.

5,000 yards, 1.07 inches. }

Forgings:

Weight of tube, 613 pounds.

Weight of jacket, 379 pounds.

Weight of hoop, 75 pounds.

Total weight, 1,067 pounds.

Price of gun, \$1,300.

SIGHTS.

The sights issued with these guns are similar to those supplied with the Driggs-Seabury 6-pounder gun.

SPARE PARTS.

The following spare parts are furnished with each gun, Mark II:

	Price each.
2 extractors (1 right and 1 left)	\$15.00
2 firing-pin heads	1.50
2 handle-locking springs	4.80
1 firing pin, complete	14.75
2 rear springs	3.50

The following accessories are furnished with each gun and carriage:

	Price each.
1 dismounting screw-driver, for use on carriage	
1 dismounting pin for use on cap-square	
1 screw-driver, small	
1 Babbitt metal mallet	
1 cleaning brush	
1 oil can	
1 bristle sponge and rod	
1 bristle-sponge cover	
1 lanyard	
1 lanyard hook	
1 hand extractor	
1 block-wipe rod	
1 drill-washer support	
12 drill washers	
1 breech-mechanism tool for use on firing-pin head for cocking firing pin and for sear spring	
1 gun cover or tompon	
1 breech cover	

AMERICAN ORDNANCE COMPANY (DRIGGS-SCHROEDER), MARK III.

The guns of this model in the service are numbered from 8 to 34. The breech mechanism is composed of the following:

- Breechblock.
- Vent plate.
- Cam.
- Firing-pin body.
- Firing-pin head.
- Sear.
- Sear spring.
- Drill washer.
- Drill-washer support.
- Main bolt.
- Operating handle.
- Guide bolts (2).
- Extractors (2).
- Tray.
- Tray screws (2).
- Lever stop pin.
- Lever lock.
- Lever-lock pin.
- Lever-detent spring.

The principal weights, dimensions, etc., of the Mark III gun:

- Weight of gun, 875 pounds.
- Total length, 118.55 inches.
- Length of bore, 112.2 inches.
- Exterior diameter over chamber, 8.3 inches.
- Travel of shot, 101.839 inches.

Rifling:

- Number of grooves, 18.
- Width of grooves, 0.22 inch.
- Depth of grooves, 0.022 inch.
- Width of lands, 0.1717 inch.
- Diameter between lands, 2.244 inches.
- Twist of rifling, right hand, from 0 to 1 turn in 26.36 calibers at muzzle.

Powder charge:

Kind of powder, smokeless.

Weight of charge, 20 ounces.

Density of loading, for 20-ounce charge, 0.707.

Projectiles:

Weight (filled), 6 pounds.

Ratio of weight to that of piece, $\frac{1}{11}$.

Sectional density, 1.53.

Muzzle velocity, 2400 f.s.

Maximum pressure per square inch, 34,000 pounds per square inch.

Muzzle energy, 255 foot tons.

Penetration in steel at muzzle, 5.37 inches.

1,000 yards, 3.37 inches	} Tempered uncapped steel.
5,000 yards, 1.07 inches	

Forgings:

Weight of tube, 600 pounds.

Weight of jacket, 367 pounds.

Weight of hoop, 165 pounds.

Total, 1,132 pounds.

Price of gun, \$1,100.

Price of American Ordnance Company 6-pounder mount, \$1,565

SIGHTS.

The sights for this gun are the same as those for the Mark II gun

SPARE PARTS.

The spare parts issued with each of these guns carried in the accessory chest are the following:

	Price each.
2 extractors (1 right and 1 left).....	\$15.00
1 firing pin, complete	14.75
2 firing pin springs.....	.25
1 sear spring.....	2.50

ACCESSORIES.

The following accessories are furnished with each gun and carriage:

	Price each.
1 dismounting screw-driver for use on carriage.....	
1 dismounting pin for use on cap square.....	
1 screw-driver, small	
1 babbitt-metal mallet	
1 cleaning brush	
1 oil can	
1 bristle sponge and rod.....	
1 bristle-sponge cover	
1 lanyard.....	
1 hand extractor	
1 block wipe rod	
1 drill-washer support.....	
12 drill washers	
1 breech-mechanism tool for use on firing-pin head for cocking firing pin and for sear spring	
1 gun cover for tomplon.....	
1 breech cover.....	

The spare parts for the two models of gun, Mark II and III, are not interchangeable and differ for the various guns. Therefore, in making requisitions for spare parts the model and number of gun must always be given in the requisition calling for such parts.

The accessories for the Mark II and III American Ordnance Company (Driggs-Schroeder) guns are not interchangeable, and only brushes and extractors are common to the two models. Therefore, in making requisitions for these parts the model and number of the gun should always be given in the requisition.

MOUNTS.

The Driggs-Seabury 6-pounder rampart mount are of two models, model 1898, and model 1898 modified.

MODEL 1898 DRIGGS-SEABURY 6-POUNDER RAMPART MOUNT.

The principal parts and nomenclature of the Driggs-Seabury 6-pounder rampart mounts, model 1898 (Nos. 1 to 20), are as follows:

Name of part.	No. in carriage.	Material.	Name of part.	No. in carriage.	Material.
Axle.....	1	Forged steel.	Shield.....	1	Forged steel.
Linchpin.....	2	Machine steel.	Shield brace:		
Linchpin fastening.....	2	Do.	Upper.....	2	Do.
Washer.....	2	Steel.	Lower.....	2	Do.
Do.....	2	Leather.	Recoil sleeve.....	1	Bronze.
Axle bracket.....	2	Bronze.	Recoil sleeve key.....	1	Steel.
Wheel.....	2	Archibald Co. design.	Recoil sleeve key screw.....	1	Do.
Ammunition bracket.....	2	Bronze.	Oscillating slide.....	1	Bronze.
Ammunition box holder.....	2	Do.	Oscillating slide filling piece.....	2	Do.
Ammunition box holder pivot.....	2	Do.	Oscillating slide filling piece screws:		
Ammunition bracket bolt.....	8	Steel.	Long.....	2	Steel.
Ammunition bracket bolt nut.....	8	Do.	Medium.....	2	Do.
Ammunition bracket bolt split pin.....	8	Do.	Short.....	2	Do.
Ammunition box holder spring.....	4	Hard brass wire.	Clamp handle.....	1	Forged steel.
Ammunition box complete.....	2	Steel, wood, bronze, felt.	Clamp handle screw.....	1	Machine steel.
Axle brace and anchor strap.....	1	1/4-inch steel plate.	Recoil cylinder.....	1	Bronze.
Anchor strap brace.....	1	1/4-inch steel plate.	Recoil cylinder head.....	1	Do.
Anchor.....	1	Wrought iron.	Recoil cylinder rear stuffing box gland.....	1	Do.
Anchor plate.....	2	Cast iron.	Recoil cylinder front stuffing box gland.....	1	Do.
Name plate.....	1	Bronze.	Wrench for cylinder head and front gland (model 1898).....	1	Machine steel.
Trail foot step.....	2	1/4-inch steel plate.	Recoil cylinder filling hole screw.....	2	Steel.
Trail side plate.....	2	Do.	Recoil cylinder filling hole screw washer.....	2	Leather.
Trail side plate angle.....	2	Wrought iron.	Piston rod.....	1	Machine steel.
Tool box bottom.....	1	1/4-inch steel.	Piston rod nut.....	1	Steel.
Tool box front end.....	1	Do.	Piston rod check nut.....	1	Do.
Tool box rear.....	1	Do.	Recoil cylinder spring.....	1	Do.
Tool box cover.....	1	Do.	Shoulder bar locking spring.....	1	Do.
Tool box cover hinge.....	1	Do.	Shoulder bar locking spring screws.....	2	Do.
Trail wheel bearing.....	2	Bronze.	Deflector.....	1	Bronze.
Trail wheel.....	1	Do.	Deflector rivets.....	6	Brass.
Trail wheel pin.....	1	Do.	Deflector screws.....	3	Do.
Trail wheel cradle.....	1	Do.	Deflector handle.....	1	Hard wood.
Trail wheel cradle pin.....	1	Steel.	Deflector handle screw.....	1	Steel.
Trail traverse roller.....	1	Bronze.	Deflector handle washer.....	1	Bronze.
Trail traverse roller pin.....	1	Steel.	Shoulder piece support.....	1	Hard wood.
Trail piece.....	1	Bronze.	Shoulder piece.....	1	Rubber.
Trail handle.....	2	Steel.	Shoulder piece clip.....	1	Bronze.
Hand spike.....	1	Do.	Shoulder piece screws.....	1	Brass.
Hand spike holder.....	1	Do.	Shoulder bar.....	1	Bronze.
Hand spike hook.....	1	Do.	Accessory box.....	1	Wood and bronze.
Hand spike ring.....	1	Do.	Dismounting pin.....	1	Steel.
Sponge rod clamp, complete.....	1	Brass.	Filling piece screw-driver.....	1	Do.
Sponge rod socket.....	1	Bronze.	Assembling gauge (piston rod).....	1	Do.
Spade.....	1	Cast steel.	Filling hole plug wrench.....	1	Do.
Spade pin.....	1	Steel.	Oil can.....	1	Coppered steel.
Pivot socket.....	1	Cast steel.	Babbitt metal mallet.....	1	Babbitt.
Pivot clamp screw.....	1	Steel.			
Pivot yoke.....	1	Bronze.			
Pivot yoke cap square bolt.....	4	Steel.			
Pivot yoke bolt.....	1	Machine steel.			
Pivot yoke ball-bearing washer.....	1	Machine steel and copper.			

Price of gun model 1898 and mount 1898, complete (Nos. 1 to 20), \$2,400.

The following accessories are supplied with each carriage, model 1898:

	Price each.
1 screw-driver.....	
1 babbit-metal mallet.....	
1 oil can.....	
1 cleaning brush.....	
1 bristle sponge and rod (rod in two sections).....	
1 cover for bristle sponge.....	
1 breech cover.....	
1 tompon.....	
1 dismounting pin.....	
1 filling plug wrench.....	
1 screw-driver for filling-piece screws and carrier ring in gun.....	
1 spanner wrench.....	
1 lanyard.....	
1 handspike.....	

These accessories, with the exception of the handspike, bristle sponge rod and cover, breech cover, and tompon, are carried in the accessory (tool) box furnished with each gun and carriage.

6-POUNDER DRIGGS-SEABURY RAMPART MOUNT, MODEL 1898, MODIFIED.

The principal parts and nomenclature of the Driggs-Seabury 6-pounder rampart mount, model 1898, modified (21 to 60), are as follows:

Name of part.	Number in carriage.	Material.	Name of part.	Number in carriage.	Material.
Axle.....	1	Forged steel.	Trail wheel cradle.....	1	Steel.
Linchpin.....	2	Machine steel.	Trail wheel cradle pin.....	1	Do.
Linchpin fastening.....	2	Do.	Trail wheel oil-hole screw.....	1	Bronze.
Washer.....	2	Steel.	Trail piece.....	1	Steel.
Do.....	2	Leather.	Trail handle.....	2	Do.
Axle bracket.....	2	Malleable iron.	Handspike.....	1	Do.
Wheel.....	2	Archibald Co. design.	Handspike holder.....	1	Do.
Ammunition bracket.....	2	Malleable iron.	Handspike hook.....	1	Do.
Ammunition box holder.....	2	Do.	Handspike ring.....	1	Do.
Ammunition box holder pivot.....	2	Do.	Sponge-rod clamp complete.....	1	Malleable iron.
Ammunition bracket bolt.....	8	Steel.	Sponge rod socket.....	1	Do.
Ammunition bracket bolt nut.....	8	Do.	Spade pin.....	1	Cast steel.
Ammunition bracket bolt split pin.....	8	Do.	Pivot socket.....	1	Steel.
Ammunition box holder spring.....	4	Hard brass wire.	Pivot clamp screw.....	1	Cast steel.
Ammunition box (complete).....	2	Steel, wood, brass, felt.	Pivot yoke.....	1	Steel.
Axle brace and anchor stirrup.....	1	1/4-inch steel plate.	Pivot yoke cap square.....	2	Do.
Anchor stirrup brace.....	1	1/4-inch steel plate.	Pivot yoke cap square oil hole screw.....	2	Do.
Anchor V rods.....	1	Wrought iron.	Pivot yoke cap square bolts.....	4	Steel.
Anchor plate.....	2	Cast iron.	Pivot yoke bolt.....	1	Machine steel.
Anchor rod pin and fastener.....	1	Steel.	Pivot yoke bolt bearing washer.....	1	Machine steel and copper.
Anchor rod pin washer.....	1	Do.	Shield.....	1	Steel.
Name plate.....	1	Bronze.	Shield upper locking pin.....	1	Do.
Trail foot step.....	1	1/4-inch steel plate.	Shield upper locking pin socket.....	1	Do.
Trail side plates.....	2	Do.	Shield hinge.....	2	Bronze.
Trail side plate angle.....	2	Wrought iron.	Shield apron.....	1	Steel.
Tool box bottom.....	1	1/4-inch steel.	Shield apron springs.....	3	Do.
Tool box front end.....	1	Do.	Shield apron locking pin.....	1	Do.
Tool box rear.....	1	Do.	Shield locking pin socket.....	1	Do.
Tool box cover.....	1	Do.	Shield chain eye.....	1	Do.
Tool box cover hinge.....	1	Do.	Shield brace:.....		
Trail wheel bearing.....	2	Bronze.	Upper.....	2	Spring steel.
Trail wheel.....	1	Steel.	Lower.....	2	Do.
Trail wheel pin.....	1	Do.	Shield bolts:.....		
			Long.....	2	Steel.
			Medium.....	2	Do.
			Short.....	4	Do.
			Recoil sleeve.....	1	Bronze.
			Recoil sleeve key.....	1	Steel.

Name of part.	Number in carriage.	Material.	Name of part.	Number in carriage.	Material.
Recoil sleeve key screw	1	Steel.	Piston rod check nut...	1	Steel.
Oscillating slide.....	1	Bronze.	Recoil cylinder spring..	1	Do.
Oscillating slide filling piece.	2	Do.	Shoulder bar.....	1	Bronze.
Oscillating slide filling piece screws:			Shoulder bar locking spring.	1	Steel.
Long.....	2	Steel.	Shoulder bar locking-spring screws.	2	Do.
Medium.....	2	Do.	Deflector.....	1	Bronze.
Short.....	2	Do.	Deflector rivets.....	6	Brass.
Oscillating slide oil hole screw.	4	Bronze.	Deflector screws.....	3	Do.
Clamp handle.....	1	Forged steel.	Deflector handle.....	1	Hardwood.
Clamp handle screw...	1	Machine steel.	Deflector-handle screw.	1	Steel.
Bracket for Scott telescope sight complete	1	Bronze with steel screw.	Deflector-handle washer	1	Bronze.
Recoil cylinder.....	1	Bronze.	Lanyard pulley (complete).	1	Do.
Recoil cylinder head...	1	Do.	Shoulder-piece support.	1	Hardwood.
Recoil cylinder rear stuffing box gland.	1	Do.	Shoulder piece.....	1	Rubber.
Recoil cylinder front stuffing box gland.	1	Do.	Shoulder-piece clip....	1	Bronze.
Wrench for cylinder head gland and piston rod nuts.	1	Machine steel.	Shoulder-piece screws..	1	Brass.
Recoil cylinder filling hole screw.	2	Steel.	Accessory box.....	1	Wood and bronze.
Recoil cylinder filling hole screw washer.	2	Leather.	Dismounting pin.....	1	Steel.
Piston rod.....	1	Machine steel.	Filling-piece screw-driver.	1	Do.
Piston rod nut.....	1	Steel.	Assembling gauge (piston rod).	1	Do.
			Filling-hole plug wrench.	1	Do.
			Oil can.....	1	Coppered steel.
			Babbitt-metal mallet...	1	Babbitt.

Price of mounts (Nos. 21 to 60), \$350.

The following accessories are supplied with each mount, model 1898, modified:

	Price each.
1 screw-driver for sights.....	
1 babbitt-metal mallet.....	
1 oil can.....	
1 cleaning brush.....	
1 bristle sponge and rod (rod in two sections).....	
1 cover for bristle sponge.....	
1 lanyard, short.....	
1 lanyard, long.....	
1 breech cover.....	
1 tompon.....	
1 dismounting pin.....	
1 wrench for filling-hole plug.....	
1 double screw-driver for carrier ring in gun and filling-piece screws.....	
1 spanner wrench for cylinder-head glands and piston-rod nuts.....	
1 tool for assembling trigger pin.....	
1 wrench for assembling firing-pin head.....	
1 pin punch for removing small pin in firing pin.....	
1 assembling gauge for piston and cylinder.....	
1 handspike.....	

These accessories are carried in the accessory (tool) box furnished with each gun and carriage, except the handspike, bristle sponge rod and cover, breech cover, and tompon.

SPARE PARTS FOR DRIGGS-SEABURY MOUNTS.

The following parts are supplied with 6-pounder Driggs-Seabury parapet mounts of both models for such posts as have guns of this kind mounted:

	Price each.
2 linchpins	
2 linchpin fasteners	
2 ammunition box holder springs	
4 split pins, $\frac{1}{8}$ inch	
1 pivot clamp screw	
1 pivot clamp screw pad, with keys	
4 split pins, $\frac{1}{8}$ inch	
1 pivot ball bearing, complete	
1 oscillating slide clamp screw	
1 oscillating slide clamp handle	
1 deflector handle	
1 counter recoil spring	
1 filling-hole screw	
1 set of packing for recoil cylinders	
1 set of locking pins, with chain, sockets, etc., complete, for lower shield	
1 sponge and rod	
1 cleaning brush	

A complete set of these spare parts should always be kept on hand by the ordnance officer at the post.

ESSENTIAL DIFFERENCES BETWEEN MODEL 1898 AND 1898 MODIFIED DRIGGS-SEABURY
6-POUNDER CARRIAGE.

The model 1898 modified Driggs-Seabury 6-pounder rampart mount differs from the model 1898 in the following:

The trail traverse roller is replaced by a trail shoe plate.

The shield is wider and is assembled to the mount by curved spring braces. The vertical part is made longer and is fitted with a hinged apron which can be folded up against the vertical part when the carriage is used at the anchorage and let down for use in the open.

The shoulder bar has a downward offset just in front of the breech in order to clear the revolving block when swung open.

The right trunnion of the oscillating slide is provided with a seat for a telescopic sight.

The aperture for the telescopic sight is cut in the shield.

The anchorage is made heavier, and a hook by which it was attached to the mount changed to a clevis.

Several minor changes in the accessories were also made.

Speaking generally, the spare parts of the carriages, model 1898 and 1898 modified, and the accessories are not interchangeable, and in making requisitions for either the model and number of the carriage must be given in the requisition.

AMERICAN ORDNANCE COMPANY 6-POUNDER RAMPART MOUNTS.

There are ten 6-pounder mounts of this design in service (Nos. 1 to 10), model 1898. (The guns originally furnished with these carriages being Driggs-Schroeder, Mark II, were sold to the Quartermaster's Department for transport service.)

The principal parts and the correct nomenclature of this carriage are as follows:

Name of part.	Number in carriage.	Material.	Name of part.	Number in carriage.	Material.
Axle.....	1	Steel.	Outer elevating screw..	1	Bronze.
Linchpin.....	2	Do.	Inner elevating screw..	1	Steel.
Linchpin fastening.....	2	Do.	Inner elevating screw pin.	1	Do.
Linchpin fastening pivot.	2	Do.	Inner elevating screw pin washer.	1	Do.
Axle washer.....	2	Do.	Inner elevating screw pin nut.	2	Do.
Do.....	2	Rawhide.	Fork bar.....	2	Do.
Ammunition box.....	2	Wood and sheet iron.	Fork bar screw.....	2	Do.
Ammunition-box bracket (1 right and 1 left).	2	Bronze.	Trunnion bed support (1 right, 1 left).	2	Bronze.
Ammunition-box holder.	4	Do.	Cap square (1 right, 1 left).	2	Do.
Ammunition-box holder pin.	4	Steel.	Cap square locking pin.	2	Steel.
Ammunition-box pin, large.	4	Do.	Cap square locking pin key.	2	Do.
Ammunition-box pin, small.	4	Do.	Cap square locking pin key chain.	2	Do.
Ammunition-box bracket bolt.	4	Do.	Cap square bolt.....	2	Do.
Ammunition-box hinge.	2	Bronze.	Cap square chain eye..	2	Do.
Ammunition-box hump and turn buckle.	1	Do.	Cradle.....	1	Bronze.
Axle plate, upper.....	1	Steel.	Cradle stop.....	2	Do.
Axle plate, lower.....	1	Do.	Cradle stop screw:		
Axle reinforce angles.....	2	Do.	Long.....	4	Steel.
Wheels.....	2	Wood and steel.	Short.....	2	Do.
Wink plate (1 right and 1 left).	2	Steel.	Cradle clamp handle...	1	Do.
Front transom.....	1	Do.	Cradle clamp handle bolt.	1	Do.
Trail separator bolt:			Recoil sleeve.....	1	Bronze.
Upper.....	1	Do.	Recoil cylinder.....	1	Do.
Middle.....	1	Do.	Recoil cylinder head...	1	Do.
Lower.....	1	Do.	Recoil cylinder rear gland.	1	Do.
Trail shoe.....	1	Bronze.	Recoil cylinder front gland.	1	Do.
Trail handle (1 right and 1 left).	2	Steel.	Recoil cylinder washer.	1	Lead.
Recoil rod.....	1	Do.	Recoil cylinder filling plug.	1	Steel.
Trail recoil pins.....	1	Do.	Piston rod.....	1	Do.
Anchor rod.....	2	Do.	Piston rod nut.....	2	Do.
Anchor rod turn buckle.	2	Bronze.	Counter recoil spring...	1	Do.
Anchor rod turn buckle, locking nut.	2	Do.	Shield.....	1	Do.
Anchor rod clevis.....	2	Steel.	Shield brace.....	2	Do.
Anchor rod clevis bolt...	2	Do.	Shield brace bolt:		
Anchor rod eye washer.	1	Do.	Large.....	2	Do.
Pintle.....	1	Do.	Small.....	4	Do.
Pintle washer.....	1	Do.	Shield brackets:		
Pintle nut.....	1	Do.	Upper.....	2	Bronze.
Pintle socket.....	1	Do.	Lower.....	2	Do.
Elevating fork hanger..	1	Steel angle	Apron.....	1	Steel.
Gear box bracket.....	1	Bronze.	Apron brace.....	2	Do.
Gear box bracket cap square.	1	Do.	Apron brace brackets, front (2 right, 2 left).	4	Bronze.
Gear box bracket cap square bolt.	2	Steel.	Apron brace brackets, rear.	2	Do.
Gear box and nut combined.	1	Bronze.	Apron brace bracket pin.	4	Steel.
Bevel gear.....	1	Steel.	Apron brace bracket screw pin.	4	Do.
Handwheel shaft and pinion.	1	Do.	Apron brace bracket pin chain eye.	4	Do.
Outer handle wheel bearing.	1	Bronze.	Apron brace bracket pin chain.	4	Do.
Handle wheel shaft bracket.	1	Do.	Apron hinge.....	3	Bronze.
Handle wheel shaft bracket cap square.	1	Do.	Handspike.....	1	Wood and metal trimmings.
Handle wheel shaft bracket cap square bolt.	2	Steel.	Handspike attachment:		
Handle wheel.....	1	Bronze.	Upper.....	1	Steel.
			Lower.....	1	Do.
			Traverse circle.....	1	Cast steel.

The wooden handspike is the only accessory furnished with this carriage, and when not in use is attached to the right side of the trail.

DRILL CARTRIDGES.

There are furnished with each 6-pounder gun of either the Driggs-Seabury or American Ordnance Company (Driggs-Schroeder design) 4 drill cartridges. These drill cartridges are designed at the same time to answer the purpose of a subcaliber tube, and are composed of the following:

Projectile	\$3.30
Brass case	1.10
Bronze head	1.45
Bronze nose nut	1.05
Steel springs .....	.30
Steel rifle barrel	2.29
Total	9.49
Assembling	1.05
	10.54

The service rifle caliber .30 ammunition must not be used in the 6-pounder drill cartridges, its primer not being adapted for the blow of the firing pins of these pieces. A special caliber .30 cartridge has been adopted for this purpose and requisition will be made for "Artillery drill cartridges, caliber .30," for use with these guns. (G. O., 66, A. G. O., 1903.)

DECAPPING AND PRIMING TOOLS.

There are issued to each post equipped with 6-pounder R. F. guns of either the Driggs-Schroeder or Driggs-Seabury design one set of decapping and priming tools. This set is designated as "Set of decapping and priming tools for 6-pounder R. F. case," and composed of the following:

1 bronze capping and decapping anvil ^a	\$2.25
1 bronze decapping guide	2.00
1 steel decapping spindle, long	1.25
1 steel capping spindle, short .....	.37
Total	5.87

AMMUNITION.

The ammunition for all the various models 6-pounder guns, whether of the American Ordnance Company (Driggs-Schroeder) or Driggs-Seabury design, is of the same dimensions, etc., and interchangeable. It is fixed ammunition, and consists of cartridge case, the primer, the powder charge, the projectile, and the fuse. Price per round C. I. shell, \$3.84; A. P. shell, \$4.25.

PRIMERS.

Both long and short primers have been issued with this ammunition.

The long primer is about the size of a rifle blank cartridge and projects some distance in the case, containing in addition to the fulminate an igniting charge of black powder which takes the place of a separate igniter.

The short primer is situated wholly within the head of the case and contains only the fulminate. With this primer a separate igniting charge of black powder is used.

PROJECTILES.

Two kinds of projectiles only are used with this gun; common shell and steel shell. The bursting charge for both these shell is black rifle powder, and both drilled and tapped, taking Driggs-Seabury percussion fuse.

^a Recessed on one side for capping; the other for decapping.

DRIGGS-SEABURY FUSE.

The fuse for both the common and steel shell of all 6-pounder guns is the Driggs-Seabury base percussion fuse consisting of the following parts:

Body, gun metal.	} Price of fuse, \$—.
Plunger, gun metal.	
Spring, tempered steel.	
Detonating cap, brass.	

The ammunition for the 6-pounder guns has heretofore been packed in pine boxes holding 12 rounds, the boxes being provided with rope handles at each end for convenience in handling, the lids being fastened down with screws.

All future deliveries of ammunition will be made in boxes zinc lined and hermetically sealed.

15-POUNDER R. F. GUN (DRIGGS-SEABURY).

For full and complete description see pamphlet "Instructions for mounting, using, and caring for 15-pounder rapid-fire guns," published by Ordnance Department.

WEIGHTS, DIMENSIONS, ETC., OF 15-POUNDER GUN.

Weight, 1,782 pounds.
 Total length, 154.5 inches.
 Length of bore, 50 calibers.
 Maximum diameter over chamber, 10.25 inches.
 Outside diameter recoil band or sleeve:
 Vertical, 18.600 inches.
 Horizontal, 10.990 inches.
 Powder-chamber seat for case:
 Diameter in rear, 3.904 inches.
 Diameter beginning of choke, 3.408 inches.
 Diameter front, 3.100 inches.
 Length, 23.67 inches.
 Capacity of cartridge, 200 cubic inches.
 Travel of projectile in bore, — calibers, 128.630 inches.
 Projectiles:

Kind.	C. I. shell.	Steel shell.	Shrapnel.
Weight, filled, pounds.....	15	15	15
Ratio of weight to weight of piece.....	rtw	rtw	rtw
Weight of bursting charge (rifle powder), pounds..	48	62	20
Length, calibers.....	3.7	4	4
Sectional density.....	2.12	2.12	2.12
Price ^b	\$9.06	\$10.74	\$13.50

^a With fuse.

^b Complete round fixed ammunition.

Powder:

Kind, smokeless.
 Weight of charge, 5 pounds (not including igniting charge).
 Density of loading, 0.6920.

Muzzle velocity, 2,600 feet per second.

Maximum pressure per square inch, 34,000 pounds.

Muzzle energy, 703 foot-tons.

Terminal velocity, 2,068 feet per second at 1,000 yards; 971 feet per second at 5,000 yards.

Penetration in steel at—

Muzzle, 5.37 inches.
 1,000 yards, 3.82 inches.
 2,000 yards, 2.72 inches.
 3,000 yards, 1.94 inches.

Rifling:

Number of grooves, 24.
 Width, 0.2927 inch.
 Depth, 0.030 inch.
 Width of lands, 0.100 inch.
 Twist of rifling, one turn in 50 calibers to one turn in 25 calibers at 9.13 inches from muzzle, being uniform over the 9.13 inches.

Price of guns, Nos. 1 to 80, both inclusive, with mounts, \$4,600.

Guns Nos. 81 to 120, both inclusive, \$1,615 each.

Component parts of breech mechanism of 15-pounder R. F. gun (Driggs-Seabury).

	Weight.	Price.
	<i>Lbs. oss.</i>	
Breechblock		
Carrier-plate ring		
Carrier plate		
Operating lever		\$88.30
Firing pin		7.45
Firing-pin spring		1.95
Sear		19.50
Sear spring		1.80
Hinge pin		2.60
Lever-catch plunger		1.30
Cotter pin .....		.50
Plunger spring .....		.80
Extractor		

SIGHTS.

For day sighting the model 1899, Type "A," telescopic sight for rapid-fire guns, is issued, one for each gun, attached by means of a bracket directly to the shoulder bar on trunnion of gun and used in connection with the sight drum having its bearing in the shoulder bar, and the elevation device for gun. No open sights are furnished. For full description of telescopic sight and instructions for its use see "Handbook of Sights for Cannon," published by Ordnance Department; also see page 330, this manual.

For night sighting "electric night sights" are issued, one for each gun being attached to shoulder by means of a bracket. For list of component parts, etc., of these sights see page 330, this manual.

FUSES.

Fuse used with the 15-pounder ammunition is the "Driggs base percussion fuse," for cannon and steel shell. The component parts of this fuse are:

	Price.
Body	
Plunger	
Fuse spring	
Detonating cap	

With the 15-pounder Driggs-Seabury shrapnel there is used the "high resistance 15-second combination fuse F. A." (For price see page 347.)

PRIMERS.

The primers used with the 15-pounder ammunition are "percussion primers for 15-pounder ammunition." (For price see page 352.)

SPARE PARTS FOR GUN.

The following spare parts for gun are issued for 15-pounder R. F. gun:

	Allowance.		Price.
	Per gun.	Per post.	
Firing pin.....		1	\$7.45
Firing-pin springs.....	1	1	1.96
Sear.....		1	19.50
Sear springs.....	1		1.80
Operating lever pin.....		1	1.50
Hinge pin.....		1	2.50
Plunger.....		1	1.80
Cotter pin.....		1	.50
Plunger spring.....	1		.80
Lock bolt.....		1	2.50
Lock-bolt spring.....	1		1.50
Lock-bolt spring screw.....	1		.25

A supply of these spare parts should always be kept on hand at post. In ordering spare parts always give the name of maker, model, and number of gun for which parts are required.

SUBCALIBER TUBE.

For subcaliber practice there are issued drill cartridges fitted with .30 caliber tube one cartridge to each gun.

The component parts of drill cartridge are:

Parts.	Price each.
Projectile.....	\$5.96
Brass case.....	2.05
Bronze head.....	2.00
Bronze nose nut.....	1.05
Steel springs.....	.80
Steel rifle barrel.....	2.51
Assembling.....	14.17
	1.20
Total.....	15.37

The service rifle caliber .30 ammunition must not be used in the 15-pounder drill cartridges, its primer not being adapted for the blow of the firing pins of these pieces. A special caliber .30 cartridge has been adopted for this purpose and requisition will be made for "Artillery drill cartridges, caliber .30," for use with these guns. (G. O., 66, A. G. O., 1903.)

15-POUNDER (3-INCH) MASKING PARAPET MOUNT (DRIGGS-SEABURY).

The official names of the parts of mount, their weights, location, etc., for carriages 1 to 120 are as follows:

Official name of parts.	Attached to—	Material.	Number.	Diameter.	Length.	Weight.	Remarks.
Outer base.....	Set in concrete	Steel.....	1	<i>Ins.</i> 40 $\frac{1}{2}$	<i>Ins.</i> 49 $\frac{1}{2}$	<i>Lbs.</i> 2,905	For Nos. 1 to 50, inclusive.
Do.....	do.....	do.....	1	41 $\frac{1}{2}$	50	3,065	For Nos. 51 to 120, inclusive.
Inner base.....	Outer base.....	do.....	1	17 $\frac{1}{2}$	54	1,715	For Nos. 1 to 50, inclusive.
Do.....	do.....	do.....	1	17 $\frac{1}{2}$	54 $\frac{1}{2}$	1,790	For Nos. 51 to 120, inclusive.
Holding-down bolt	Inner and outer bases	do.....	8	1	4 $\frac{1}{2}$		8 nuts.
Hand-hole covers	Inner base.....	Cast iron	2				
Hand-hole cover chains.	do.....	do.....	2				
Counterweight....	Between inner and outer bases.	do.....	1	35 $\frac{1}{2}$	23	4,755	For Nos. 1 to 50, inclusive.
Do.....	do.....	do.....	1	37 $\frac{1}{2}$	23	5,133	For Nos. 51 to 120, inclusive.
Counterweight chains.	Pivot socket and counterweight.		2		46 $\frac{1}{2}$	12	4 nuts.
Chain-shackle pin.	Chain shackle.....	Steel.....	2	4	2 $\frac{1}{2}$		2 washers and 2 split pins.
Chain wheel.....	Chain-wheel pin and operating shaft.	Cast iron	2				
Chain-wheel pin..	Inner base.....	Steel.....	1	1 $\frac{1}{2}$	5 $\frac{1}{2}$	3	1 washer and 1 split pin.
Operating shaft....	do.....	do.....	1	1 $\frac{1}{2}$	25 $\frac{1}{2}$	12	
Ratchet wheel.....	Operating shaft	Bronze	1	4 $\frac{1}{2}$	1 $\frac{1}{2}$	5	1 taper pin.
Ratchet-wheel pawl.	Inner base.....	Steel.....	1		3 $\frac{1}{2}$		
Ratchet-pawl stem.	Ratchet-wheel pawl.	do.....	1	4 $\frac{1}{2}$	3 $\frac{1}{2}$		1 washer and 1 split pin.
Pivot socket.....	Inner base.....	do.....	1	13 $\frac{1}{2}$	52	1,080	2 bronze collars and 1 steel pad.
Pivot-socket bar...	Pivot socket.....	do.....	1		17 $\frac{1}{2}$	13	
Pivot-socket clamp	Inner base.....	do.....	1				
Ball-bearing washer.	Pivot socket and pivot yoke.	Steel, with copper thimble.	1	8.95		13	2 screws, 29 steel balls, 4-inch diameter.
Pivot yoke	Pivot socket.....	Steel.....	1		41 $\frac{1}{2}$	604	A few of the first made are of bronze.
Cap squares	Pivot yoke.....	do.....	2		9	7 $\frac{1}{2}$	1011-hole screw.
Cap-square bolts...	Cap squares and pivot yoke.	do.....	4	1 $\frac{1}{2}$	4 $\frac{1}{2}$	1 $\frac{1}{2}$	
Horizontal clamp lever.	Pivot yoke	do.....	1		16 $\frac{1}{2}$		1 set screw.
Horizontal clamp wedge.	Clamp lever.....	do.....	1		4.85		
Oscillating slide...	Pivot yoke	Bronze	1		27 $\frac{1}{2}$	231	6011-holescrews.
Counter-recoil buffer.	Oscillating slide.....	Leather	1		6 $\frac{1}{2}$		4 screws and 2 plates.
Filling piece	do.....	Bronze	2		7	1 $\frac{1}{2}$	6 screws.
Elevating rack	do.....	do.....	1		7 $\frac{1}{2}$	8 $\frac{1}{2}$	3 screws.
Elevation stop.....	do.....	do.....	2				6 screws.
Recoil sleeve	Gun.....	do.....	1	11 $\frac{1}{2}$	12	146	1 key and 1 set screw.
Recoil cylinder....	Sleeve and slide.....	Steel.....	1	6 $\frac{1}{2}$	20 $\frac{1}{2}$	89	1 vent and 1 filling-holescrew.
Cylinder head.....	Cylinder.....	Bronze	1	5 $\frac{1}{2}$		14	1 leather gasket.
Stuffing-box gland.	do.....	do.....	1	2 $\frac{1}{2}$		1 $\frac{1}{2}$	For rear end.
Do.....	do.....	do.....	1	2 $\frac{1}{2}$		2 $\frac{1}{2}$	For front end.
Piston rod.....	Cylinder and slide	Steel.....	1	1 $\frac{1}{2}$	32 $\frac{1}{2}$	19 $\frac{1}{2}$	2 nuts.
Counter-recoil spring.	Piston rod and cylinder.	do.....	2				
Vertical clamp....	Pivot yoke.....	do.....	2	1 $\frac{1}{2}$			
Shoulder bar.....	Oscillating slide.....	Bronze	1		39 $\frac{1}{2}$		
Shoulder piece.....	Shoulder bar	Wood	1				
Shoulder-piece bolt	Shoulder piece	Bronze	3	4	2 $\frac{1}{2}$		3 nuts.
Shoulder-piece clip	do.....	do.....	3				3 screws.
Hose.....	do.....	Rubber	1	2	11 $\frac{1}{2}$		
Handle.....	Shoulder bar	Bronze	1			2 $\frac{1}{2}$	
Trunnion bolt.....	Left trunnion	Steel.....	1	4	2 $\frac{1}{2}$		
Trunnion-bolt washer.	do.....	do.....	1	3 $\frac{1}{2}$		1	
Elevation indicator	Shoulder bar.....	Bronze	1			1	2 screws.
Shoulder-barguide	Oscillating slide.....	do.....	1		11	8 $\frac{1}{2}$	

Official name of part.	Attached to—	Material.	Number.	Diameter.	Length.	Weight.	Remarks.
Guide bolt.....	Shoulder-bar guide and slide.	Steel.....	2	In. $\frac{1}{2}$	In. $5\frac{1}{2}$	Lbs. $1\frac{1}{2}$	2 split pins and 2 nuts.
Elevating worm...	Worm shaft.....	do.....	1	2.89	$2\frac{1}{2}$	3	
Spring.....	do.....	do.....	1	$1\frac{1}{2}$	$1\frac{1}{2}$	$\frac{1}{2}$	
Ball bearing.....	do.....	Bronze.....	1	$2\frac{1}{2}$			2 screws.
Worm shaft.....	Shoulder bar.....	Steel.....	1		$10\frac{1}{2}$	$2\frac{1}{2}$	1 nut.
Handwheel.....	Worm shaft.....	Bronze.....	1	$7\frac{1}{2}$		$5\frac{1}{2}$	
Indicator drum.....	Shoulder bar.....	do.....	1	6.1		$3\frac{1}{2}$	1 celluloid strip.
Drum cover.....	Indicator drum.....	do.....	1	5.6		$3\frac{1}{2}$	
Spring.....	Drum cover and boss on shoulder bar.	Steel.....	1			$\frac{1}{2}$	
Clamp bolt.....	Indicator drum and shoulder bar.	do.....	1	$\frac{1}{2}$	2.85		1 nut.
Drum guard.....	Shoulder bar.....	Bronze.....	1	$3\frac{1}{2}$		$2\frac{1}{2}$	3 screws.
Shield.....	Shield braces.....	Steel.....	1			694 $\frac{1}{2}$	
Shield braces.....	Pivot yoke.....	do.....	2	$1\frac{1}{2}$	13.4	$9\frac{1}{2}$	Upper, 4 nuts.
Do.....	do.....	do.....	2	$1\frac{1}{2}$	12 $\frac{1}{2}$	$8\frac{1}{2}$	Lower, 4 nuts.
Shield boss.....	Shield and brace.....	do.....	4	$1\frac{1}{2}$	$4\frac{1}{2}$	$1\frac{1}{2}$	8 nuts.
Lanyard.....	Sear and 3 guides.....	Brass wire around cord.	1				1 check nut and 1 set screw; 2 nuts.
Handle.....	Lanyard.....	Wood.....	1				
Guide.....	Gun.....	Bronze.....	1				2 screws.
Do.....	Sleeve.....	do.....	1				Do.
Do.....	Oscillating slide.....	do.....	1				Do.

Price of mounts (with guns), Nos. 1 to 78, both inclusive, \$4,600; mounts 79 to 118, both inclusive, \$1,855 each.

There have been manufactured for issue to the service two "Casemates mounts," Nos. 1 and 2, for the 15-pounder Driggs-Seabury gun.

Price of gun and casemate mount, complete, \$4,175.

SPARE PARTS FOR 15-POUNDER MOUNT.

The following spare parts for 15-pounder masking parapet mount are issued to the service, the number given being per post:

	Price.
1 ratchet wheel.....
1 ratchet pawl and stem.....
6 split pins, $\frac{1}{4}$ -inch.....
2 split pins, $\frac{1}{2}$ -inch.....
2 counterweight chains with eyes and bolts.....	\$5.19
1 pivot yoke, ball bearing, complete.....
2 oil-hole screws for cap squares.....
1 rubber buffer for oscillating slide.....
1 washer for oscillating slide.....
4 buffer screws for oscillating slide.....
2 elevating stops.....
6 elevating-stop screws.....
1 counter recoil spring.....
1 air-hole screw.....
1 filling-hole screw.....
1 set of packings for cylinders.....
2 washers for air and filling plugs.....
1 cylinder-head packing.....
1 recoil-sleeve key and screw.....
1 indicator drum sight, complete.....
1 elevating worm thrust, ball bearing, complete.....
1 elevating worm spring.....
1 shoulder-bar handle.....
1 pivot-yoke clamping screw.....
1 pivot-yoke set screw.....
1 set electrical outfit.....
1 pivot-socket clamp screw.....
1 ratchet lever, complete.....
1 lanyard and guide, complete.....
1 sponge.....
1 cleaning brush.....
1 hook for assembling indicator drum.....
1 wrench for assembling indicator drum.....

TOOLS AND ACCESSORIES FOR 15-POUNDER GUN AND MOUNT.

The following tools and accessories are contained in tool box:

	Price.
1 box wrench for cylinder head.....
1 double wrench for pivot clamping, lever-set screw, and cylinder-filling plug.....
1 wrench for assembling indicator drum.....
1 hook for assembling indicator drum.....
1 screw-driver for filling-piece screws.....
1 screw-driver (wooden handle).....
1 cap-square dismounting pin.....
1 babbitt-metal mallet.....
1 oil can.....
1 hand extractor.....
1 lanyard and connection.....
1 hand brush.....
1 tomplon.....

The following accessories are not contained in tool box:

	Price.
1 breech cover.....
1 bristol sponge and staff, with extensions.....
1 cover for bristle sponge.....

DECAPPING AND PRIMING TOOLS.

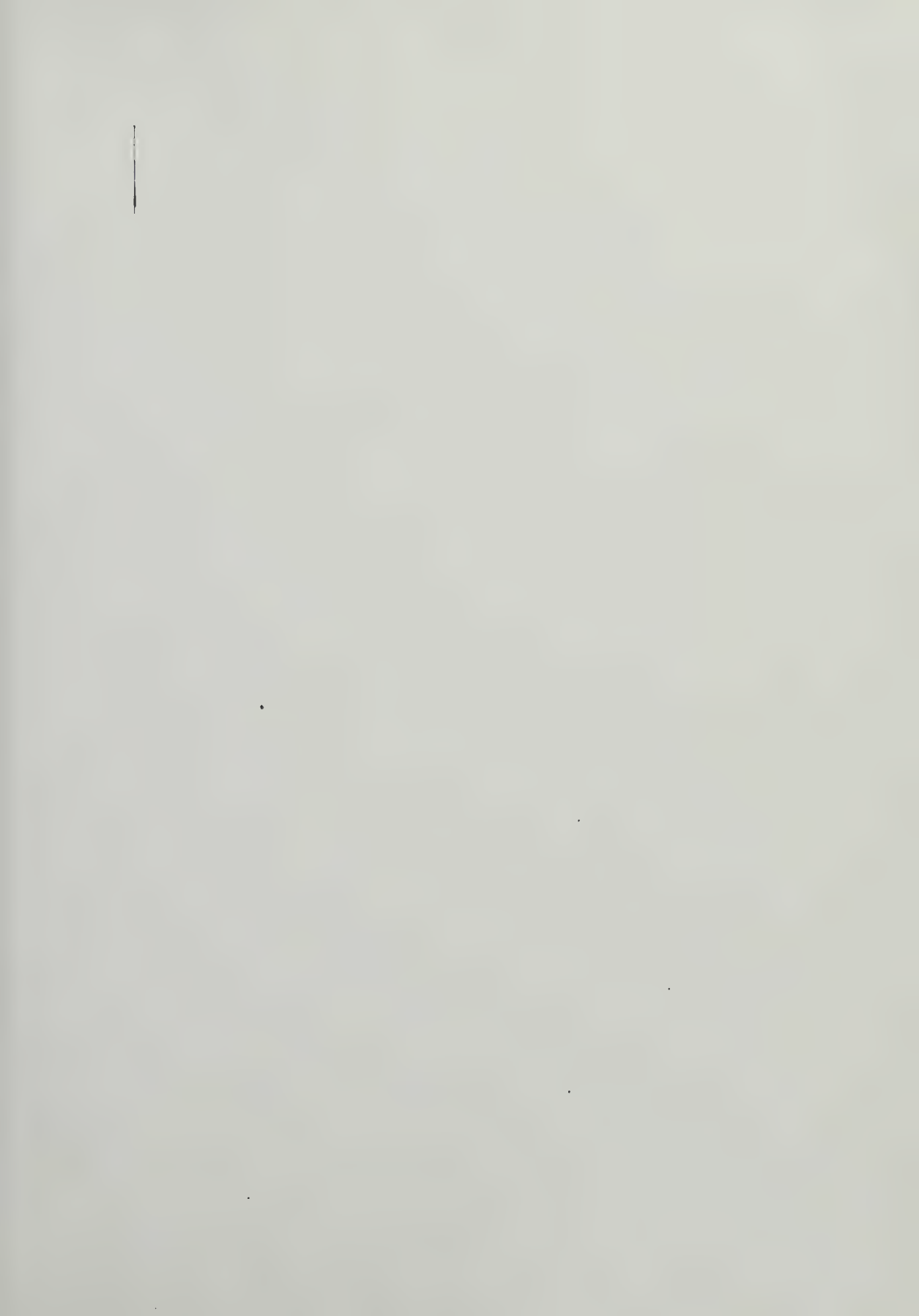
There are issued with each 15-pounder gun a set of decapping and priming tools. This set is termed a "Set of decapping and priming tools for 6 and 15 pounder guns," and is composed of the following:

	Price each.
1 bronze capping and decapping anvil ^a	\$2.75
1 bronze decapping guide.....	2.00
1 steel decapping spindle, long.....	1.80
1 steel capping spindle, short.....	.87
Total.....	6.42

^a Double recessed one side for capping, the other for decapping both sizes.

CLEANING MATERIALS.

For allowance of cleaning materials per annum per gun and carriage, see pages 359, 360.



1



CHAPTER VIII.

RANGE FINDERS, AZIMUTH INSTRUMENTS, INSTRUMENTS OF PRECISION FOR SYSTEM OF FIRE CONTROL, DRAWING INSTRUMENTS, MATERIAL, ETC.

RANGE FINDERS.

The use of the Lewis depression position finder for the service was approved by the Secretary of War, April 19, 1896. Two kinds of the Lewis instruments are issued to the service as follows:

The Lewis type A for primary stations with elevations for the horizontal axis of the instrument above mean low water of 60 feet and above.

The Lewis type B (emergency type) was originally issued for use on the interior crest of batteries. Its use being designed (as named) to be an emergency instrument for use in the event of the disablement of the type A instrument, or its failure to work, also a supplementary instrument, as a check on the type A instrument. This instrument was only issued to such posts at which the heights of the interior crest of batteries was 60 feet or higher above mean low water. The issue of these instruments for the purpose here stated was suspended by G. O. 59 A. G. O. 1903, and the adoption of the new system of fire control and direction, and they are now issued and used as azimuth reading instruments only, as provided in the General Orders referred to and in the new system of fire control and direction.

The Rafferty depression position finder, type B, was adopted and issued to the service for the same uses and purposes as the Lewis type B, but only to such posts at which the heights of the interior crest of batteries above mean low water was between the limits of 30 and 60 feet, this instrument being graduated for these heights. Its issue for the purposes named has also been suspended and it is now only issued and used as an azimuth reading instrument under the same authority as given for the Lewis instrument of the same class.

For all sites with an elevation below 60 feet (previous to the adoption of the permanent system of fire control and direction and in the absence of a satisfactory horizontal base range finder) it was designed to use the horizontal base system referred to in G. O. 59 A. G. O. 1903. For use in the equipment of this system the Ordnance Department had designed and constructed and issues to the service a highly improved azimuth instrument (W. and S. model 1900). These instruments are issued in such numbers as to provide, together with the emergency range finders on hand at a post, one azimuth reading instrument for each base end of a horizontal base line.

The type A Lewis range finders are issued to the service upon requisition, so far as the supply of the instruments on hand will permit, one to each primary or secondary station.

The type B Lewis and type B Rafferty are issued to the service upon requisition, so far as the supply on hand will permit, for the purpose given in G. O. 59 A. G. O. 1903, to wit, azimuth reading instruments.

In making requisition for type A or B Lewis depression range finders great care should be taken to give the following accurate data, as it is absolutely essential before the instruments can be issued, saves much time, unnecessary delay, and correspondence:

For type A:

1. Elevation of the horizontal axis of the instrument above mean low water.
2. Extreme variation of the tide above and below mean low water.
3. The distance of the instrument from the directing gun.

For type B:

1. Height of crest of battery above plane of reference where instrument is to be used. (Plane of reference is the height of mean low water.)
2. Extreme variation of the tide above and below mean low water.

In making requisition for Rafferty range finder care should be exercised to ascertain that the limits of graduation for which same is to be used do not fall below 30 feet or above 60 feet, as the instrument can only be used between these limits, and will not work even a small fraction of a point either way.

There has been designed and constructed a special packing box for both the frame and telescope of the type A, and the entire type B instruments for use in storing same, and more especially in transporting them when necessity of repairs or other purposes require their shipment. When orders are given for the shipment of these instruments they should invariably be shipped in these boxes to avoid damage in transit. When not in use the Type B instrument should always be kept in this case, care being taken to see that the cover is always placed over the object glass before placing the instrument in the box. Price of set of packing boxes for Type A, \$24.25. Packing box for type "B," \$16.15.

If the frame or telescope of a Type A instrument is temporarily dismounted, they should be immediately placed in these boxes until the instrument is to be again replaced.

A cover has been designed, manufactured, and issued to the service by the Ordnance Department for the purpose of covering the type A instrument when installed in the station, to protect it from dust, moisture, etc. It is designated as "Cover for type A range finder." It is made at and issued from Rock Island Arsenal. (Price \$5.20 each.)

Bases for Lewis type B and Rafferty range finders, and Warner & Swasey azimuth instruments to be set in concrete on the interior crest of batteries, are furnished in such numbers as may be required for the equipment of the respective observation stations provided by the Engineer Department at each post. The base for the Lewis and W. & S. azimuth instruments (for the latter called pier mount) are of circular form and that for the Rafferty triangular.

The subscales of all range finders and azimuth instruments are to be regraduated to one-hundredth of a degree to conform to the change in the grading of the subscales of azimuth circles on guns and mortars from minutes to one-hundredth of a degree.

All subscales of range finders and azimuth instruments not regraduated will be properly regraduated upon application being made to the Chief of Ordnance.

TEMPORARY SYSTEMS OF FIRE CONTROL.

In order that each battery may be provided with a system of fire control, pending the final establishment of a permanent system, each fire commander and each battery of 8-inch, 10-inch, and 12-inch guns and 12-inch mortars will, in addition to the vertical system now in use, be provided with a horizontal base line, for which two azimuth reading instruments are necessary. Each battery of 6-inch rapid-fire guns will also be provided with a horizontal base, when it is the largest caliber battery at the post, but not otherwise. To provide azimuth reading instruments for each

horizontal base line, all type "B" and Rafferty range finders on hand at posts will be used as azimuth instruments, and requisition will be made for such number of azimuth instruments as in addition to those already on hand, together with the range finders above specified, will be sufficient to supply the base lines proposed, and until further orders no additional emergency range finders will be issued. It is impracticable at present to install and equip more than one horizontal base for any one battery or group of guns. (G. O., 59, A. G. O., 1903.)

PERMANENT SYSTEM OF FIRE CONTROL AND DIRECTION.

The system of "fire control and direction" tested at Fort Barrancas, Fla., was, upon the recommendation of the Board of Ordnance and Fortification, approved by the Secretary of War, as recommended by the Chief of Artillery, and stands as the permanently adopted system of "fire control and direction" for the service at all posts.

For this system there are to be equipped the following stations:

For the fire command.

Primary station fire command (F').
Secondary station fire command (F'').
Supplementary station fire command (F''').

For the battery.

Primary station battery (B').
Secondary station battery (B'').
Supplementary station battery (B''').
Also the "plotting room."

The equipment furnished for each of these stations, upon requisition, by the Ordnance Department is as follows:

For each primary station.

- 1 Warner & Swasey depression position finder, type A.
- 1 Whistler plotting board.
- 1 brass scale arm (500 yards to the inch) for use with harbor chart.

For each secondary station.

- 1 Warner & Swasey depression position finder, type A.

For each supplementary station.

- 1 Warner & Swasey depression position finder, type A.

For each plotting room.

- 1 Whistler plotting board.^a
- 1 Pratt's ballistic board.^b
- 1 predicting scale.^a

^aImprovements and modifications of this board recommended and adopted provisionally, if satisfactory on test, will eliminate the necessity of the issue of this board and scale for use in the plotting room.

^bA device for attachment directly to the carriage of the mortar is contemplated, and if it prove satisfactory in test will give the same information obtained by this board and dispense with its issue for use of mortar batteries.

Each battery commander's station (the crow's-nests), provided on flanks of each battery, will be equipped each with—

1. Azimuth reading instrument.
2. Material for battle chart to be constructed at post. Present plotting boards 40 by 70 (or other sizes) to be retained as drawing boards for this purpose in such number as the needs of the service may demand.

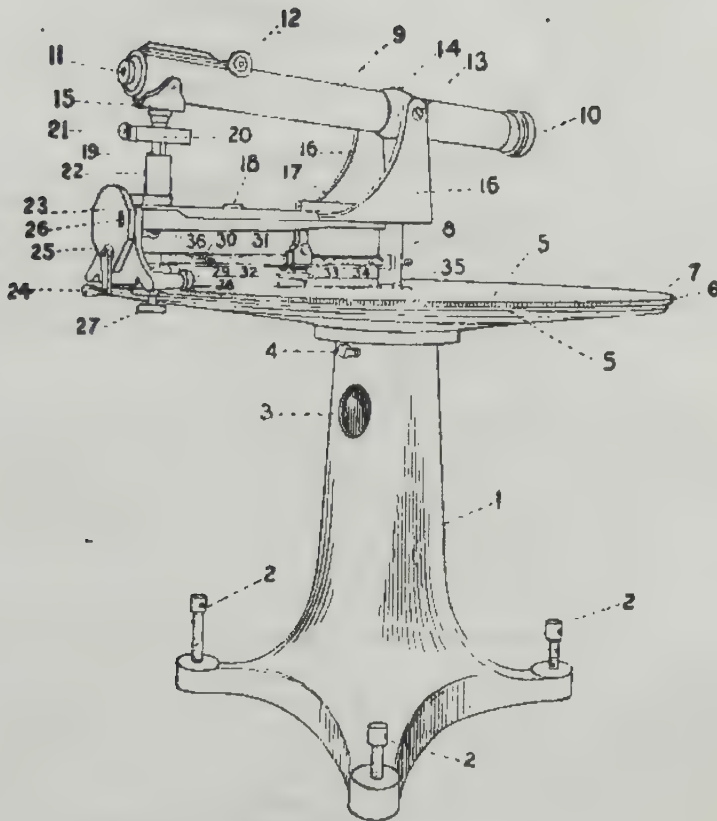
All requisitions for material or instruments to be supplied by the Ordnance Department for the original equipment of a fire control system in accordance with the approved plan must first be submitted to the Chief of Artillery for approval before issues are made by Ordnance Department. (Par. I G. O., No. 11, W. D., 1904.)

NAMES OF PARTS OF TYPE A, LEWIS DEPRESSION POSITION FINDER.

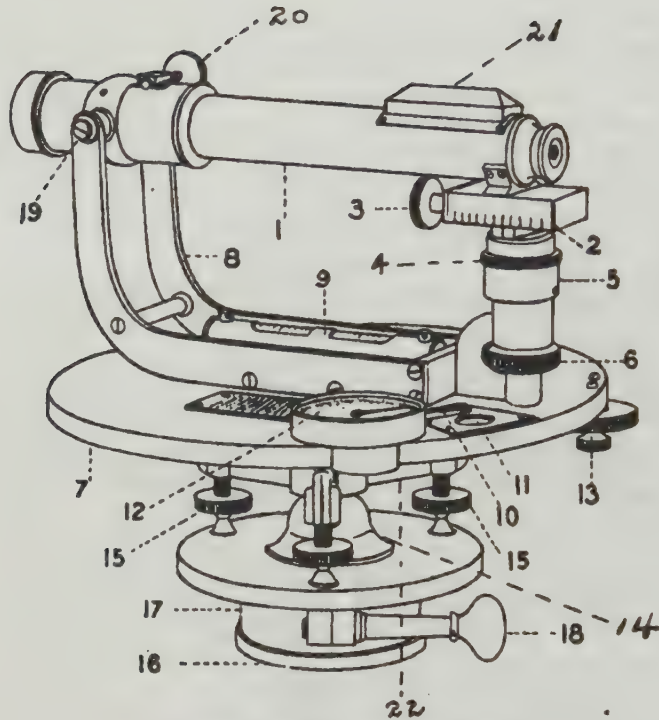
(Price of instrument, \$1,500.)

- | | |
|--|---|
| 1. Cast-iron supporting column (base). | 19. Elevating nut (elevating rod). |
| 2. Leveling screws. | 20. Tide scale block (indicates net tide scale); (tide scale box). |
| 3. Hand hole. | 21. Translating screw (tide scale screw). |
| 4. Set screw to hold table (set screw). | 22. Bracket support of elevating mechanism (elevating rod box). |
| 5. Brass table with degrees of a circle (azimuth table). | 23. Tally device (tally disk). |
| 6. Gear (azimuth gear). | 24. Crank for turning replotting screw (translating screw crank). |
| 7. Degrees of circle (azimuth graduation). | 25. Pointer indicating single yards on end of crank (tally pointer). |
| 8. Male center. | 26. Opening for reading hundreds of yards (tally window). |
| 9. Telescope tube (telescope). | 27. Handwheel (azimuth handwheel). |
| 10. Object glass and frame (object glass). | 28. Rollers. |
| 11. Eyepiece and frame (prismatic), (eyepiece), (prism cover shown on top of rear end of telescope). | 29. Dial (azimuth dial). |
| 12. Focusing screw. | 30. Translating screw. |
| 13. Trunnion screws. | 31. Replotter nut (translating nut). |
| 14. Trunnion band. | 32. Translating eccentric (spanner). |
| 15. Slotted telescope support and refraction screw (slotted support and elevating screw). | 33. Sliding nut (relocating range dial). |
| 16. Supporting arms of telescope (telescope Ys). | 34. Replotting arm (relocating arm and scale). |
| 17. Level. | 35. Dial for indicating hundredths of a degree (relocating azimuth dial). |
| 18. Opening for reading range wheel (range scale window). | 36. Motor gears for elevating mechanism (elevating rod miter gear). |

NOTE.—The nomenclature given in parenthesis is that given in the description of this instrument in "Artillery notes, No. 3," May 31, 1902, published by the Artillery School, Fort Monroe, Va.



Lewis depression position finder (type A).



Lewis position finder, emergency type (type B).

(Price of instrument, \$500.)

Nomenclature of principal parts.

- | | |
|---|--------------------------------------|
| 1. Telescope. | 13. Traversing pinion. |
| 2. Tide scale in feet. | 14. Center. |
| 3. Translating screw for tide scale. | 15. Leveling screws. |
| 4. Adjusting screw. | 16. Base. (a) |
| 5. Block and nut of range screw. | 17. Base ring. |
| 6. Milled head of range screw. | 18. Clamp for ring. |
| 7. Turntable. | 19. Horizontal axis of telescope. |
| 8. Telescope supports. | 20. Focusing screw. |
| 9. Level. | 21. Prisms. |
| 10. Range reading. | 22. Socket arms for leveling screws. |
| 11. Degree reading. | |
| 12. Device, for reading hundredths of a degree. | |

(a) Price of extra bases, \$6.50 each.

Sets of tools issued with Lewis range finders.

The following constitute and are accounted for as one set of tools for types A and B, Lewis range finders:

Type A—

	Price each.
1 hand screw-driver, large, blade $\frac{1}{2}$ inch wide	\$1.35
1 hand screw-driver, small .....	.35
1 bent screw-driver .....	.25
1 adjusting pin, small .....	.20
1 adjusting pin, large .....	.25
1 angle spanner wrench .....	.35
1 screw wrench, 6 inches .....	.75

Type B—

1 small pin for the level screws .....	.20
1 small screw-driver .....	.35

Spare parts for range finders.

Spare parts are not issued to be kept on hand for range finders. As a general rule repairs to range finders can not be made at posts. If repairs are required the Ordnance Department should be communicated with at once, indicating the parts that need attention, by the numbers and nomenclature given in the plates in this manual. Instructions will be promptly given upon receipt of such requisitions for the proper disposition of instruments to accomplish the necessary repairs.

Cleaning material for range finders.

The brass table of Lewis type A and all other metal parts of range finders, either type A or B of any manufacture, and azimuth instruments should be kept thoroughly clean by the use of silk wipers issued for the purpose by the Ordnance Department. *No polishing material of any kind should ever be used on any of the parts of the instruments, as it is injurious to the polished or lacquered surfaces.*

The allowance of silk wipers for this purpose per annum is as follows:

[All expendable.]

For each type A range finder	4
For each type B range finder	2
For each azimuth instrument	2

If any wipers are required in excess of this allowance the requisition should state the necessity therefor.

The silk wipers issued for this purpose should, under no circumstances, be used for any other purpose, but at all times kept in the special boxes provided for these instruments. The use of the wipers for other purposes will permit the taking up of grit or other hard substances that would scratch or in other ways injure the delicate parts of the instruments.

All screw threads, etc., of these instruments should be kept well oiled with the best sperm oil. For this purpose the Ordnance Department issues a high-grade clock oil in the following quantities as an annual allowance:

For each type A range finder	pint.. 1
For each type B range finder	do... $\frac{1}{2}$
For each azimuth instrument	do... $\frac{1}{4}$
(Price of oil, 35 cents per quart.)	

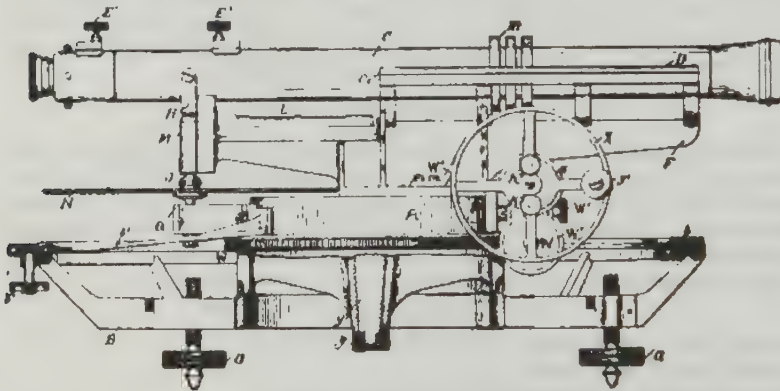
If any additional quantities of oil are required the requisition must state the necessity for the same.

RAFFERTY DEPRESSION POSITION FINDER.

(Price of instrument, \$500.)

Nomenclature of principal parts.

- a* Leveling screws.
- B* Lower limb supported by the leveling screws.
- b* Azimuth ring divided into degrees, alternately black and white.
- b*² Index arm for degrees.
- b*³ Pinion and thumbscrew for operating azimuth ring.
- y*¹ Female center screwed rigidly to lower limb.
- A* Upper limb.
- y*² Male center attached to upper limb.
- W*¹ Worm frame, which carries the worm and gearing for operating it.
- W*² Worm frame clamp screw for moving the worm into and out of gear with the worm gear.
- W*³ Gear wheel attached to worm shaft.
- W* Worm.
- x* Pinion for operating gear wheel.



Rafferty depression position finder.

- X* Minute wheel adjustable on shaft of pinion *x*, divided into 120 minutes, one half of it marked with black rim and one half with white to correspond to black and white degrees.
- W*⁴ Index arm for minutes.
- y*³ Handle for minute wheel.
- K*³ Clamp screw for minute wheel.
- F* Frame.
- L* Level.
- C* Telescope.
- C*¹ *C*² Telescope side rails.
- D* Frame side rail.
- D*¹ Height scale on frame side rails.
- m* Annular slide resting on frame side rails, in which the telescope side rails rest.
- E*¹ Eyepiece focusing screw.
- E*² Object-focusing screw.
- M* Range screw nut with female thread.
- J* Range screw.
- N* Range disk, having a spiral with range scale.

R Range index arm, in two pieces, jointed together.

*r*¹ Inner joint range index arm.

*r*² Outer joint range index arm.

*r*³ Range index.

h Height bar having scale of heights used in conjunction with other height scale.

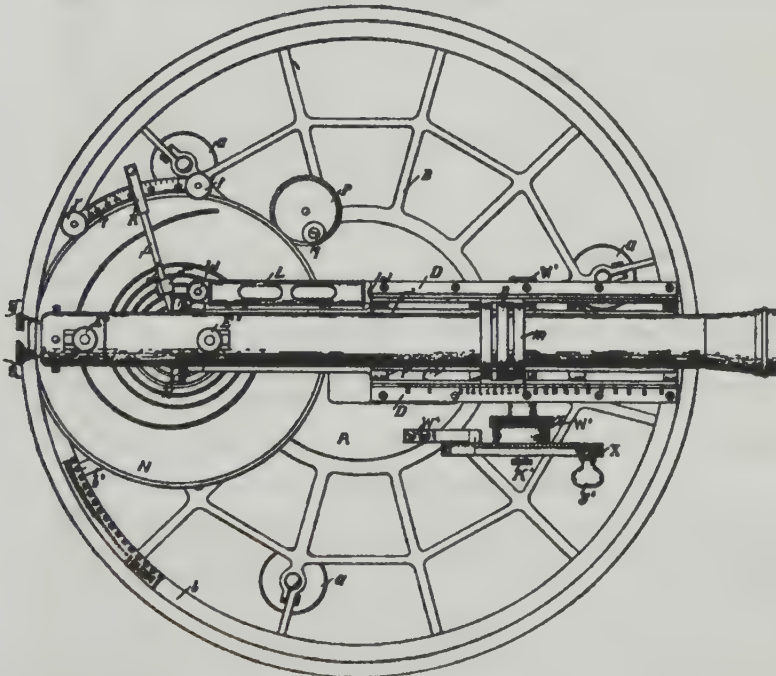
*t*¹ Clamp screw for height bar.

Q Range screw center.

q Handle of pinion for range disk.

P Pinion for operating range disk.

The base plate should be set in concrete with one of its points nearest the operator. (Price of extra bases \$5.50 each.)



Rafferty depression position finder.

ILLUMINATING DEVICES FOR RANGE FINDERS.

Types A and B Lewis Depression Range Finders and Rafferty Depression Range Finders are being equipped with illuminating device for telescope at Frankford Arsenal.

The component parts of the illuminating device for these instruments are as follows:

TYPE A.

	Price.
1 rubber switch button, at \$0.20	\$0.20
2 lamp brackets, at \$2.50	5.00
6 lamp bracket screws, at \$0.05 .....	.30
2 lamp bracket mirrors, at \$1.25	2.50
4 lamp bracket mirror screws, at \$0.05 .....	.20
2 dust caps, at \$0.75	1.50

	Price.
2 bevel mirrors, at \$0.50	\$1.00
3 mirror clips, .04-inch thick, at \$0.05 .....	.15
1 mirror clip, .02-inch thick, at \$0.05 .....	.05
4 platinum wire clips, at \$0.05 .....	.20
4 platinum wire clip screws, at \$0.05 .....	.20
1 cross wire ring, at \$1	1.00
4 cross wire ring screws, at \$0.05 .....	.20
2 vulcanite lamp holders, at \$1.50	3.00
2 lamp shields, at \$0.50	1.00
2 lamp sockets, at \$0.10 .....	.20
2 lamps, at \$0.30 .....	.60
1 vulcanite support for binding posts, at \$1	1.00
2 screws for vulcanite support, at \$0.05 .....	.10
2 double binding posts, at \$0.35 .....	.70
4 lamp holder binding posts, at \$0.20 .....	.80
2 lamp-socket screws, at \$0.10 .....	.20
2 nuts for lamp-socket screws, at \$0.10 .....	.20
2 lamp-socket insulating washers, at \$0.05 .....	.10
2 connecting strips, at \$0.20 .....	.40
1 switch, at \$0.25 .....	.25
1 switch-button screw, at \$0.05 .....	.05
1 switch contact screw, at \$0.05 .....	.05
1 double fuse block, at \$0.20 .....	.20
2 $\frac{1}{2}$ -ampere telephone fuses, at \$1.50 per hundred .....	.03
1 500-ohm resistance unit, at \$0.35 .....	.35
1 connecting wire for lamps, at \$0.10 .....	.10
Wire to connect lamps to trunnion binding posts .....	.25
Total	22.08

RAFFERTY AND TYPE B LEWIS.

1 lamp bracket	\$10.00
3 lamp-bracket screws, at \$0.15 .....	.45
1 vulcanite lamp holder	2.50
1 lamp shield .....	.75
1 lamp socket .....	.10
1 lamp .....	.30
2 binding posts, at \$0.90	1.80
1 lamp-socket screw .....	.25
1 nut for lamp-socket screw .....	.20
1 lamp-socket insulating washer .....	.05
1 connecting strip .....	.20
1 switch .....	.25
1 rubber switch button .....	.20
1 switch-button screw .....	.15
1 switch-contact screw .....	.10
1 double fuse block .....	.20
2 $\frac{1}{2}$ -ampere telephone fuses .....	.03
1 500-ohm resistance unit .....	.35
1 special resistance unit	2.00
Total	19.88

DESCRIPTION OF ILLUMINATING DEVICE FOR LEWIS RANGE FINDER, TYPE A.

The system consists of two small electric lamps in sockets attached to the rear end of the telescope, the beam of light from each lamp being reflected on the cross wires by two small mica mirrors. The lamps are approximately one-fourth candlepower and 4 volts. Their life is about thirty hours.

It is not considered desirable that the lamps should be left in the sockets continually for fear of damage, and therefore two brass covers are furnished for the sockets. These sockets should be always covered to prevent dust from entering the telescope and being deposited upon the mirrors, lenses, and prism.

Experience having demonstrated that the use of primary batteries for actuating the lamps is unsatisfactory, a resistance unit of 500 ohms is furnished. With the two lamps connected in series and this resistance unit, the voltage of a main current of 110 to 125 volts can be sufficiently reduced, and sufficient current obtained for the lamps.

The attachments include two one-fourth ampere fuses to prevent the lamps from being burned out.

With the device properly attached, the current is from main circuit, through one fuse, through resistance coil, to trunnion, to lamp, to other lamp, back to trunnion through other fuse, back to main circuit.

The latest design includes a switch on one of the lamp holders for turning on or off the lamps.

There will be issued to each post supplied with such instruments the following spare parts of this equipment for each instrument:

SPARE PARTS—TYPE A.

3 lamps, at \$0.30	\$0.90
4 $\frac{1}{4}$ -ampere fuses, at \$1.50 per hundred.....	.06
1 500-ohm resistance unit.....	.35
Total	1.31

SPARE PARTS—RAFFERTY AND TYPE B LEWIS.

2 lamps, at \$0.30	\$0.60
4 $\frac{1}{4}$ -ampere telephone fuses, at \$1.50 per hundred.....	.06
1 500-ohm resistance unit.....	.35
Total	1.01

These spare parts are what is estimated to be one year's supply and are all expandable. However, additional parts will be furnished from time to time as needed, the reason for the excess of supply being stated in the requisition.

SWASEY DEPRESSION RANGE FINDER, TYPE "A."

(Price, \$1,275.)

The Swasey Depressions Range Finder, by the decision of the Honorable the Secretary of War, has been adopted as an additional service type vertical range finder. They are issued one for each primary, secondary, and supplementary station not previously equipped with Lewis Type "A" instrument.

This instrument consists of the following principal parts, viz:

NOMENCLATURE.

- | | |
|-----------------------------------|--|
| 1. Base. | 38. Height scale pointer screw. |
| 2. Azimuth zero set screws. | 39. Safety catch. |
| 3. Azimuth plate. | 40. Steel guide. |
| 4. Azimuth plate bolts. | 41. Striding level. |
| 5. Azimuth plate handles. | 42. Striding level nut. |
| 6. Leveling screws. | 43. Telescope. |
| 7. Azimuth circle and worm gear. | 44. Telescope trunnions. |
| 8. Azimuth pointer. | 45. Dew cap. |
| 9. Vertical spindle. | 46. Objective ring. |
| 10. Cradle. | 47. Objective ring screws. |
| 11. Cradle spindle bearing. | 48. Horizontal collimating screws. |
| 12. Adjusting levels. | 49. Vertical collimating screws. |
| 13. Azimuth drum. | 50. Focusing screw. |
| 14. Azimuth drum handle. | 51. Prism cap. |
| 15. Worm screw. | 52. Eye and detaching screws. |
| 16. Worm box. | 53. Micrometer. |
| 17. Worm box pivot. | 54. Micrometer screw. |
| 18. Worm box spring. | 55. Horizontal cross wire pinion screw. |
| 19. Worm box adjusting screw. | 56. Horizontal cross wire ring. |
| 20. Worm box crank. | 57. Horizontal cross wire screws. |
| 21. Range drum. | 58. Vertical cross wire plate. |
| 22. Range drum gear. | 59. Vertical cross wire screws. |
| 23. Range drum shaft. | 60. Eyepiece. |
| 24. Range drum screws. | 61. Eyepiece adapter. |
| 25. Range drum cover. | 62. Electrical lamp, 6 volt, 2 candle-power. |
| 26. Range drum door. | 63. Lamp socket. |
| 27. Range crank. | 64. Lamp socket support. |
| 28. Range crank shaft and pinion. | 65. Lamp shield. |
| 29. Range pointer. | 66. Ground glass. |
| 30. Range pointer arm. | 67. Mirror. |
| 31. Range pointer cover. | 68. Brushes and contact rings. |
| 32. Bell crank lever. | 69. Electric supply wires. |
| 33. Height scale. | 70. Plug to replace illuminating attachment. |
| 34. Rack. | 71. Oil cups. |
| 35. Height slide. | |
| 36. Height slide pinion. | |
| 37. Height scale pointer. | |

PRINCIPAL POINTS AND DESCRIPTION OF SWASEY RANGE FINDER, TYPE A.

One turn of the handle (No. 14) for moving instrument in azimuth moves the instrument 1 degree in azimuth.

By turning the worm box crank (No. 20) toward the operator the worm screw is disengaged and the whole instrument can be revolved freely in azimuth.

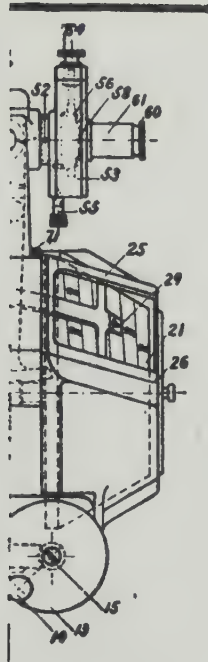
The instrument is constructed for use at any height from 40 to 400 feet. Each drum is made to cover all heights within a range of about 20 feet.

The two eyepieces are designed for use on cloudy or hazy days, and on bright days, the lower power being used for the former and the high power for the latter.

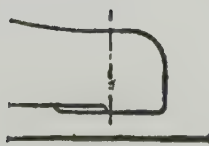
When properly adjusted the micrometer drum should read zero when the refraction is normal.

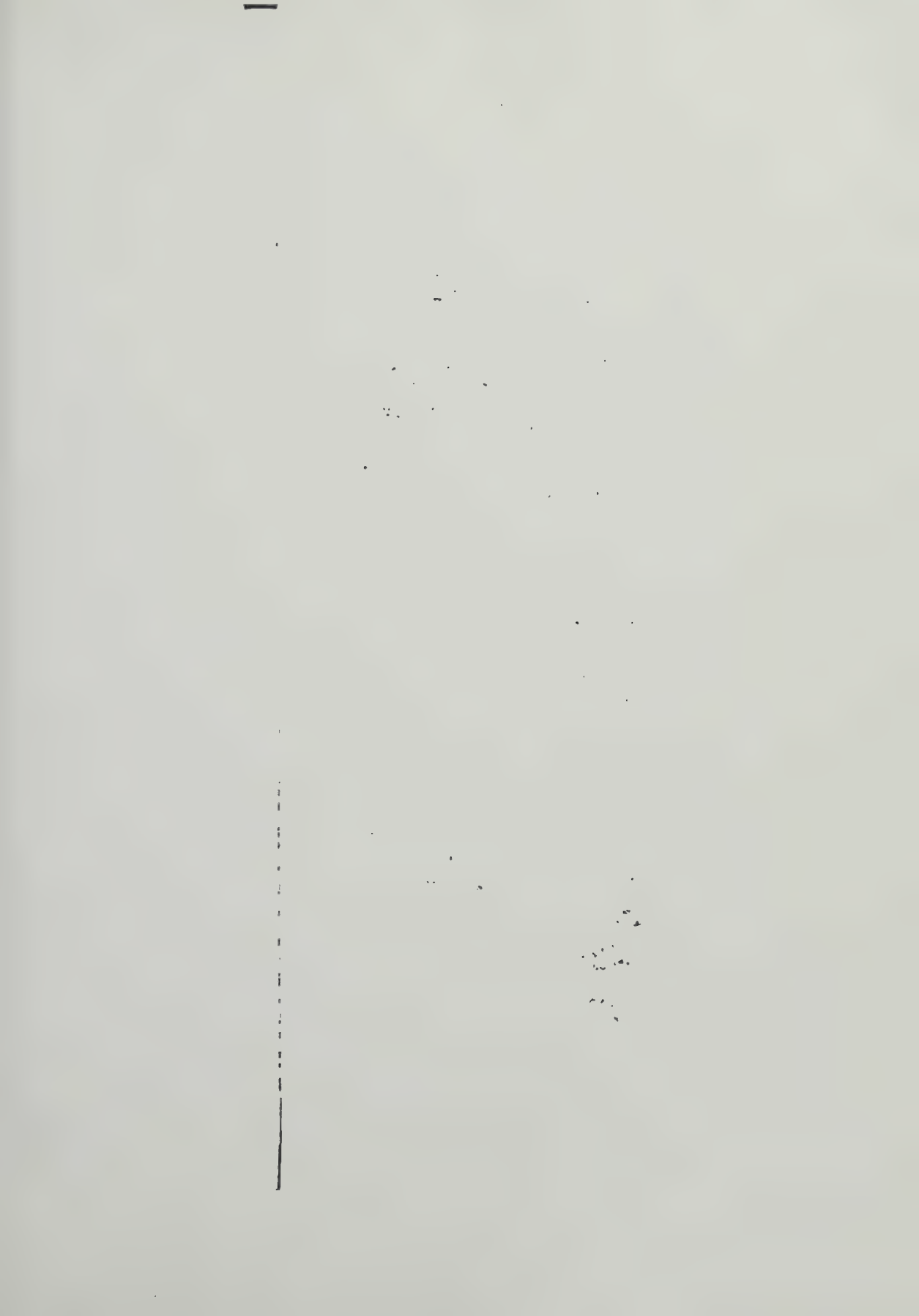
The electric lamps used for illuminating the cross wires are of 2-candlepower, about 6 volts, and 1 to 1½ amperes.

Cylindrical blocks are provided for placing the striding level, when it is desired to level the instrument at that point instead of on the telescope.

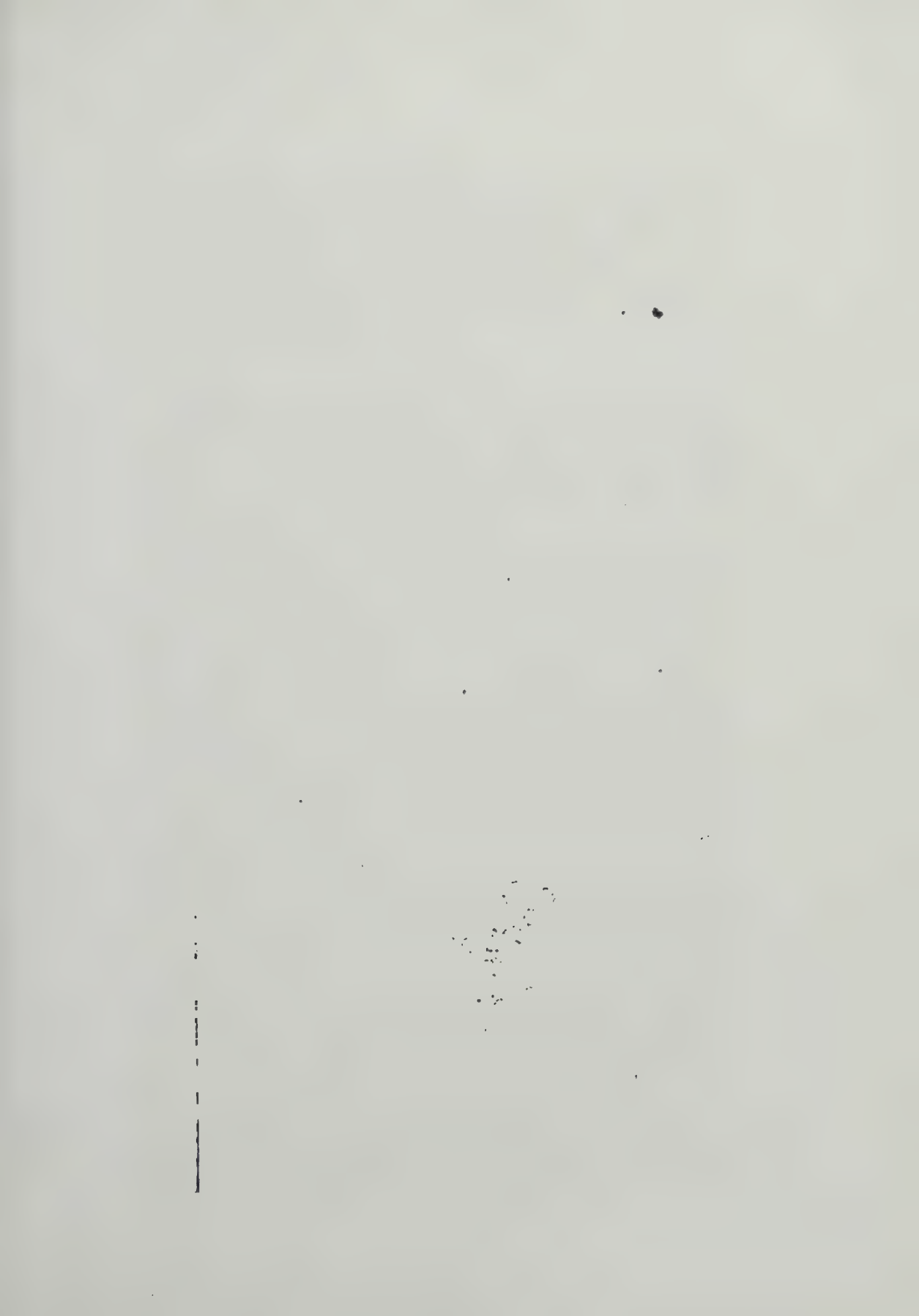


2









The telescope has an objective with 3-inch clear aperture and 30 inches focal length. It is provided with Brashear-Hastings erecting prisms. The two eyepieces are so arranged that either can be brought quickly into position. It can be reversed on its trunnions for adjustment, collimation, etc. The micrometer adjustment (drum) at the eye end is graduated to 20 seconds for the horizontal cross wire. The vertical cross wire is also arranged so it can be adjusted, if so desired.

Provision is made for height variations due to tide by means of adjustable stops for the high and low tide limits of each particular station, together with a graduated setting knob for intermediate tide heights.

DESCRIPTION.

The base which supports the instrument is secured to a masonry pier. On the column rests the azimuth-adjusting plate (No. 3) with its four handles (No. 5), by means of which the whole upper portion of the instrument can be carried. Above this plate, and connected with it by a ball-and-socket joint and by four leveling screws, is the base which carries the main taper spindle (No. 9) and the azimuth circle (No. 7). The leveling screws (No. 6) have ball-and-socket joints, and provide means for bringing the vertical spindle which supports the cradle (No. 10) carrying the telescope (No. 43) into a true vertical position.

The telescope has a 3-inch objective of 30-inch focus, a Brashear-Hastings erecting prism, and two interchangeable eyepieces (No. 60) having powers of 12 and 20 each, respectively. The objective can be adjusted for collimation by means of four screws inside the dew cap (No. 45), and when so adjusted is securely clamped by three set screws, thus making it possible to bring the optical axis of the telescope into exact coincidence with the mechanical axis of the tube. For this purpose the telescope can be reversed on its trunnions (No. 44), and is provided with a fine striding level (No. 41) reading directly to ten seconds of arc, and easily estimated to within less than half that amount. This level is mounted on two cylindrical rings concentric with the telescope tube. At the eye end of the telescope is a special micrometer (No. 53) provided with cross wires, and for convenience in observing the water line of the target a rotary motion is given to the horizontal wire by means of the knurled screw (No. 55) below the micrometer box. This wire moves in a plane at right angles to the axis of the telescope through a complete circle, either to the right or left. This is done without disturbing the line of collimation of the two cross wires, and the rotating wire can be set exactly horizontal by means of two V-shaped notches placed on the sides of the frame. To make correction in cases of abnormal refraction, the frame carrying the cross wires is given a vertical motion by means of the milled head above the micrometer (No. 54).

With the spindle (No. 9) brought into a true vertical position and the telescope accurately collimated and leveled, the telescope can be turned in a true horizontal plane, which gives an exact base from which all depression angles are measured, and renders the instrument especially adapted for determining variations due to refraction and other causes.

The large worm wheel (No. 7) by which the instrument is turned in azimuth has 360 teeth, and is graduated in degrees on the upper side of the circle. Attached to the worm is a drum (No. 13) graduated to one-hundredths of a degree, and read by vernier to six seconds. For quick motion in azimuth the worm (No. 15) is thrown out by means of a crank handle (No. 20) at the right, and since there are 360 teeth in the worm wheel, the readings of the drum are not changed when the worm is thrown into place again.

Since the depression of the instrument from 1,500 yards to 12,000 yards is but a small angle, it is of the utmost importance that the range should be read on an extended scale, and to secure this a conical drum (No. 21) is provided with a long spiral scale graduated throughout in ten-yard divisions. This conical spiral scale gives increased linear motion for constant angular motion of the drum.

The range crank (No. 27) which revolves the range drum (No. 21) is connected by means of worm and worm gear (No. 22) to the bell crank lever (No. 32), so that it moves in unison with the drum. On this lever is mounted the height scale (No. 33), which is graduated from 40 to 400 feet, and also a slide (No. 35) which carries a tide subscale. This slide supports the telescope at a point near the eye end in such manner that it is moved throughout its depression angles with the motion of the range drum. To adjust the instrument for any base height within 400 feet, it is merely necessary to set the slide at the corresponding graduation of the height scale.

CARE, ETC., OF SWASEY RANGE FINDER.

There are furnished with each Swasey range finder the following tools, constituting a set, to wit:

2 screw-drivers	} Carried in the telescope box.
1 wrench for nuts	
3 adjusting pins	
1 small brass oil can	

Each telescope is provided with a leather cap for the object glass, which should at all times remain in place when the instrument is not in use.

High-grade clock oil is furnished for the lubrication of screw threads, etc., in quantities for each instrument as provided on page 307. Care should be exercised not to use the oil in excessive quantities, closing the oil cups promptly when filled. This is essential to prevent the instrument from becoming unsightly from the oil spreading over the highly finished surfaces of the instrument and to avoid the possible accumulation of dust and dirt in the oil holes, creating grit, and thus inviting possible serious injury to the delicately finished parts.

Cotton waste should at no time be used in the care of the instrument, but silk wipers only (see provision for Lewis instrument, page 307), which will be issued for this purpose in the quantities as specified on page 307.

The electric lamp for the illuminating device for the cross hairs is of a special design; that is, it is a stock Edison lamp with a short base so as to permit of one complete turn of the lamp in screwing it into its socket. It should not be attempted to use the regular stock 2-candlepower lamp which will only enter the socket one-fourth of a turn, thus permitting same to be easily shaken from its position and broken. Requisitions should state clearly that the lamps are required for these instruments. The allowance of extra lamps is 3 per instrument per annum. If an additional number are required the requisition should fully set forth the reasons for same.

Parts for the illuminating device, such as lamp holders, socket supports, lamp shields, etc., are not issued as spare parts, but are only issued from time to time as required to replace unserviceable ones. This rule applies also to the illuminating devices of other range finders and azimuth instruments (except as provided on page 311).

The illuminating device of the Swasey range finder is not provided with the necessary resistance units or reduction coils to reduce the voltage of the general circuit (when so attached) to 6, the limit of the lamp. Provision must therefore be made before using the device on such circuit for this reduction by the department installing the lighting system of the post. The wires should always be inducted through the base of the instrument, as shown on Plate I, to avoid the wires interfering at any time with the free movement of the instrument in azimuth.

If the cross wires are broken they may be replaced at the post (wires being supplied upon requisition for this purpose) by removing the micrometer cap by taking out the screws. New wires can be readily inserted.

If it should be necessary to do the work at an arsenal, by reason of damage to the cross-wire rings, or for other reasons, the eyepiece only need be sent. This can be removed by taking out the eye-end detaching screws (No. 52). In shipping the eyepiece it should be very carefully packed and shipped by express.



MR. AZIMUTH TEL
1900 DESIGN 6A
P. & S. WARE CO.

WASH. FIELD-UNIT WASH. DIST.

AZIMUTH INSTRUMENT, MODEL 1900.

(Price of instrument, \$270.)

Names of principal parts.

- | | |
|---------------------------------------|-------------------------------|
| 1. Telescope tube. | 25. Worm box. |
| 2. Telescope trunnion. | 26. Worm-box spring. |
| 3. Trunnion clamp screws. | 27. Worm-box pivot. |
| 4. Focusing knob. | 28. Worm-box adjusting screw. |
| 5. Sunshade. | 29. Worm-box eccentric crank. |
| 6. Sunshade cap. | 30. Index disk. |
| 7. Objective cell. | 31. Index pointer. |
| 8. Objective. | 32. Disk crank. |
| 9. Eyepiece adapter. | 33. Worm-adjusting screw. |
| 10. Eyepiece. | 34. Reading opening. |
| 11. Eye lens. | 35. Azimuth clamp. |
| 12. Field lens. | 36. Azimuth slow motion. |
| 13. Cross-wire holder. | 37. Telescope yoke. |
| 14. Cross wire. | 38. Yoke caps. |
| 15. Brashear-Hastings erecting prism. | 39. Levels. |
| 16. Prism holder. | 40. Level holders. |
| 17. Prism cap. | 41. Level adjusting screws. |
| 18. Cross-wire adjusting screws. | 42. Plumb bob. |
| 19. Instrument base. | 43. Plumb-bob chain. |
| 20. Leveling screws. | 44. Tripod head. |
| 21. Spindle head. | 45. Tripod cap. |
| 22. Worm gear. | 46. Tripod thumbscrew. |
| 23. Graduated circle. | 47. Tripod legs. |
| 24. Worm screw. | 48. Pier mounts. |

Principal improvements embodied in the model 1900 instrument.

The power of these telescopes is 6 and the field 4 degrees, instead of power of 15 and field of 3 degrees.

A crank is attached to the worm for quick motion in azimuth.

A slow-motion screw working against a spring box is provided for fine setting.

The ring for holding the platinum cross wires is provided with four clamps for fastening the wires in place and makes the matter of replacing broken wires comparatively simple.

The last 150 Warner and Swasey azimuth instruments (model 1900) manufactured, Nos. 185 to 334, both inclusive, have the index disk altered to 2".25 diameter instead of 1".75, and the circumference of same covered with coin silver $\frac{1}{4}$ inch thick instead of silver wash.

Illuminating device for azimuth instruments.

Illuminating devices are furnished for azimuth instruments when desired. The principle of the device and spare parts and allowance issued for same are identical with those for the Lewis type B and Rafferty range finders. The cost of the complete device is \$15.50. (See page 310.)

WELDON RANGE FINDERS.

(Price of instrument, \$19.46.)

Weldon range finders are issued to all batteries of field artillery, whatever guns they may be equipped with, three to each battery.

For more detailed description of range finders and azimuth instruments, instructions for their operation, care, use, etc., see pamphlets published by Ordnance Department, U. S. Army, entitled "Description of Types A and B, Lewis Depression Position Finders, with instructions for their Operation and Care;" "Description of Azimuth Instruments, Model 1900, with Instructions for their Care, etc.;" "Description and Instruction, etc., of Rafferty Depression Position Finder," and "Description and Instructions for Use of Weldon Range Finder."

CROSS HAIRS OF RANGE FINDERS AND AZIMUTH INSTRUMENTS.

When preferred the Ordnance Department will, upon requisition, arrange to substitute platinum wires of 0.001" diameter for the spider lines, in both types A and B, Lewis depression position finders. For this purpose the eyepiece and eyepiece holder of the telescope should be sent to the arsenal.

In the later model azimuth instruments the platinum wire cross hairs are fastened to the carrying ring by means of small clamp screws, making it possible to readily replace cross hairs or wires of these instruments at post. The Ordnance Department will furnish the wires upon requisition. If the azimuth instruments on hand are of earlier patterns without these clamp screws, the Ordnance Department will, upon requisition, supply them.

PRISMS OF TELESCOPES OF RANGE FINDERS.

If difficulty is found with the erecting prisms of eyepieces of Lewis range finders by reason of adjusting screw working out, the Ordnance Department will, upon requisition, have same remedied by the application of knurled locking nuts to the adjusting screws.

Azimuth instruments are issued to siege batteries, two to each battery.

Telescopic sights are issued to siege batteries, one for each gun in service with battery, and for field batteries one for every two guns. As soon as supply will admit one for each gun will be provided.

Thermometers and barometers are no longer issued by the Ordnance Department and are now issued to the service by the Signal Corps.

Anemometers and clocks are issued by the Signal Corps.

Instruments for observation of fire with graphic tables will not be generally issued to the service until the completion of tests and report upon those issued for trial, making the adoption of some definite model possible. Pending the adoption of a definite model or kind of instrument the telescope of the latest model azimuth instrument issued to the service will be found an excellent substitute for this purpose. For description of instruments issued for trial see "Drill Regulations for Coast Artillery." Price of instrument, \$270.

Instruments for obtaining wind components are no longer issued by the Ordnance Department. Requisitions should be made to the Signal Corps. (G. O. 86, A. G. O., 1903.) Price of instrument, issued by Ordnance Department, \$24.

CHRONOGRAPHS.

Chronographs are not regularly issued to the service. A few have been issued to posts for special purposes. These were the Boulenger-Breger Improved Chronographs. A chronograph complete consists of the following:

- 1 standard carrying the magnets and knife mechanism.
- 1 tube for the long rod to drop into.
- 1 long rod.
- 1 short rod.
- 2 cylindrical makeweights.
- 1 measuring scale.

- 3 screws for fastening to cast-iron stand.
- 1 disjuncter.
- 1 rheostat for each circuit.
- 1 cast-iron stand having 3 leveling screws and clips for holding large tube.
- 1 small table for rheostats and disjuncter.
- 100 small porcelain insulators with screws.
- 10 pounds No. 20 copper insulated wire, paraffined.
- 3,000 feet No. 18 weatherproof insulated copper wire.
- One dozen battery connectors.
- 10 recorders.
- 1 2-ounce bottle 3-1 oil (to prevent rust).
- 1 piece electric tape.
- 24 Edison-Leland cells, type Q.

Dry cells are not satisfactory for use with chronographs, and will not be furnished. The Edison-Leland cells, type Q, only will be furnished.

The use of the latter batteries give a constant current and will generally be found to require little care, are simple of construction, and easily set up.

The Boulange chronographs are of two patterns, the one made in France and fully described in the pamphlet "Description and instructions for use of Boulange chronograph," issued by the Ordnance Department, and the other the instrument made by Queen & Co., of Philadelphia, Pa. The latter is a duplicate of the French instrument, except the rheostats, pedestal, and table. In place of the separate table in the French instrument, the Queen instrument has a shelf attached to the pedestal of the instruments for the rheostats and disjunctors. The rheostat of the Queen instrument consists of a drum wound with a spiral of resistance wire. The drum has a cogwheel meshing with a similar wheel on the end of the feed screw. This screw carries a finger which is moved over the resistance wire by a thumbcrew.

The circuit of the chronometer comprises the following parts:

- The carbon of the battery.
- The electro magnet of the chronometer.
- The safety contact of the chronometer.
- The right side of the disjuncter.
- The right side of the rheostat.
- The first screen.
- The zinc of the battery.

For complete instructions for the use and installation of the Boulange chronograph see pamphlet "Description and instructions for the use of the Boulange chronograph," published by the Ordnance Department.

Price of instruments: French make, \$375 each; American make, \$350 each.

PRATT BALLISTIC BOARD.

This ballistic board, by direction of the Secretary of War, on the recommendation of the Board of Ordnance and Fortification, has been adopted as a service instrument of its class, one to be issued to each plotting room.

The ballistic board consists of a box which carries a ruler supported by sprocket chains and wheels, and is counterbalanced by a lead weight within the box which moves in sliding ways.

On the left end of the ruler is an adjusting screw for the purpose of adjusting the ruler to the horizontal guide lines on the chart. The ruler is fitted with a fixed scale of ranges, graduated to every 10 yards, having a compass of 2,600 yards. The 100 yards and the subdivisions thereof are indicated on the scale. The 1,000 yards of range are indicated by means of a tally device below the scale.

Above the scale is a sliding bar called the bar, upon which is a fixed point styled the register. Attached to the bar and sliding thereon is a trammel, having two

pointers attached thereto. The upper one is called the pointer and the lower one the index.

The tally device is a movable rod, upon which is engraved in three places numbers from 1 to 12. Three circular windows are placed under the scale opposite the three zeros, the number of the tally being so arranged that if a given number is shown in the center window the next lower number will be shown in the left window and the next higher in the right window.

On the upper edge of the ruler is also a scale graduated to hundredths of a degree, by means of which the deflection corrections are read off.

Within the box are spring catches for securing the ballistic chart. The chart is a double graphic ballistic table, the left-hand table giving range corrections and the right-hand table giving deflection corrections.

Each table is entered with two arguments, one of which is the range and the other the abnormal conditions which affect the flight of the shot. In each case the ordinates are range. In the left-hand table the abscissas are the abnormal conditions which affect range; in the right-hand table the abscissas are the dev. wind effects corrected for drift.

The resulting corrections to be made are read from the ruler by means of the registering devices which have been described.

The ruler is merely a mechanical adding machine, which determines the algebraic sum of all the corrections to be made.

The sets of curves on the chart are as follows: First, curve for atmosphere corrections, for each 1 per cent of change of weight of air, plus or minus. Second, curves for each 10 miles of wind, range corrections. Third, curves for variation in tide. Fourth, curves for variation in muzzle velocity. Fifth, curves for each 10 miles of dev. wind corrected for drift.

On each side of the chart are a set of parallel lines for adjusting the ruler.

In each set of curves there is a vertical straight line, styled the normal line, or simply the normal.

For complete instructions for use, etc., of this board, see pamphlet "Description and Instructions for use and care of Pratt Ballistic Board" issued by Ordnance Department, U. S. A.

The allowance of these boards is one for each "Battery Commander's station" at post. Price, \$62 each.

PLOTTING BOARDS.

Plotting boards are issued to seacoast fortifications upon requisitions, in such sizes as may be required to properly prepare the necessary harbor charts, difference charts, direction tables, etc.

For purposes of permanent harbor charts the Ordnance Department has designed and issued to the service a "zinc top plotting board," on which the harbor chart can be durably marked with an ink made of platinum bichloride 4 per cent, gum arabic 2 per cent, and water 94 per cent.

For description and its use see circular on Description and Use of Plotting Boards with Zinc Top, published by the Ordnance Department.

The allowance of plotting boards per post will be one board for permanent harbor charts for each relocating room, battery commander's, fire commander's, and district fire commander's station. One board each for the same locations for the preparation of difference charts, direction tables, etc., and one drawing board 50 by 60 inches, or such other size as may be required for general drafting purposes at post.

The necessary metal scale arms (not to exceed one) will be issued with each board, of such length and graduation as may be desired by the requiring officer.

The size of the plotting boards generally issued to the service for use in the preparation of harbor charts is 40 by 70 inches, and 18 by 24 inches for difference charts, etc., with metal scale arms graduated 200 or 500 yards to the inch.

If plotting boards of sizes other than 40 by 70 inches are required for the permanent charts, the requisition must state the necessity for the special sizes. The same rule applies to scale arms asked for in excess of the allowance.

In making requisition for these boards the requisition should clearly state the number required, kind (zinc top or plain), size, length of metal scale arm and what graduation, and for what station required—i. e., battery commander's station, relocating room of battery, giving the name of the particular battery for which required, to wit: Battery "Bowdoin," or Battery "Humphrey," etc.

By the adoption of the new system of fire control and direction the issue of the large plotting boards for harbor charts has been abolished. These boards, however, may be retained at posts, so many as may be needed, for use as drawing boards to prepare battle charts, etc.

WHISTLER QUADRANT PLOTTING BOARD.

This board has been adapted for the service and will be issued one for each primary station and each plotting room of the adopted system of fire control and direction when installed at post. The boards will be either 2 or 3 quadrant as may meet the requirements of the post. Requisitions must state if they should be right or left hand. Price of boards, 2 quadrant, \$200; 3 quadrant, \$225.

PRICE OF PLOTTING BOARDS.

	Price each.
40 by 70 inch zinc top, complete.....	\$23.00
Scale arms for 40 by 70 inch boards.....	17.20
18 by 24 inch boards (with metal scale arms, complete).....	9.00
50 by 60 inch plain boards, complete.....	18.50

RELOCATER BOARDS.

No definite type of relocater board has been adopted. A limited number of "Phillips" relocater boards have been purchased and issued to the service for trial. Price each, \$100.

ENGINEERS' TRANSITS.

Engineers' transits are no longer issued by the Ordnance Department. Requisitions for these instruments should be made to the Engineer Department. (G. O., 86, A. G. O., 1903.)

DIFFERENCE CHARTS.

Difference charts are not issued by the Ordnance Department. The nature of the charts is such that the data required depends entirely upon local conditions and are available only at post, therefore, can only be constructed at post, for which purpose plotting boards and necessary drawing materials are issued.

AUXILIARY SCALES.

These scales (sometimes called predicting scales) are issued in connection with plotting boards. The scales are issued to posts upon requisition, the allowance being one to each plotting room, under the adopted system of fire control and direction.

For description of this scale and instructions for its use see pamphlet, Report on Fire Control and Fire Direction Employed at Fort Wadsworth, New York Harbor, by Maj. G. N. Whistler, Artillery Corps, U. S. Army, issued by the Adjutant-General's Office.

Price of scales, \$3.50 each.

The adoption of the modified Whistler Plotting Board dispenses with the issue of these scales.

BRASS SCALE ARMS.

In accordance with the provisions of the adopted system of fire control and direction brass scale arms (500 yards to the inch) are issued, one to each "primary station" for use with harbor chart; one to each "battery commander's" station for use with "battle chart."

SETBACK CHARTS AND CORRECTION TABLES.

Setback charts and correction tables are not issued by the Ordnance Department, but are prepared at the posts for which required.

DIAGONAL TANGENT SCALES.

The following diagonal tangent scales for base-line plotting boards are furnished by the Ordnance Department, upon requisition, in such quantities as may be required from time to time:

- 25-inch scale.
- 27-inch scale.
- 29-inch scale.
- 33-inch scale.

RANGE TABLES FOR MOUNTAIN, FIELD, SIEGE, RAPID-FIRE, AND SEACOAST GUNS.

Range tables for mountain, field, siege, rapid-fire, and seacoast guns are issued by the Ordnance Department upon requisition.

The range and battery commanders' tables, and gun commanders' range scales for seacoast guns, are issued, for distribution, to the ordnance officers of artillery districts in accordance with the following allowances:

1. To each battery commander, three copies of the B. C. and range tables of the caliber of gun mounted in his battery; one for file in the emplacement book, one to be posted in the B. C. station, and one for use in the battery. Also, one copy of gun commanders' range scale for each gun mounted in his battery, and one for the emplacement book.
2. To the commanding officer of each coast artillery company, *for use in instruction*, ten copies of each B. C., and range table and gun commanders' range scale for each caliber of gun mounted at the post where his company is serving and to which his company may be assigned for instruction.

In addition to these, tables are issued to officers as follows:

1. One copy of each table to each artillery officer, for his personal file.
2. One copy of each table to the commanding officer of each coast artillery post, for headquarters file.
3. One copy of each table to the commanding officer of each coast artillery company, for the files of his office.

Requests for these tables should state the purpose for which required and the number of tables remaining on hand.

G. C. RANGE SCALE BOXES.

Boxes for gun commanders' range scales are issued to the service upon requisition, one for each gun of 8-inch caliber and larger. (Price, \$5.50 each.)

MISCELLANEOUS AND DRAWING INSTRUMENTS AND DRAWING MATERIALS.

The following miscellaneous instruments, drawing tools, materials, etc., are issued to each seacoast post garrisoned by not over two companies of seacoast artillery. For posts garrisoned by more than two companies, one additional set of drawing instruments will be issued for each additional two companies.

The material given is estimated to be one year's supply.

	Price.
Drawing instruments:	
2 sets drawing instruments, Key brand, No. 6241 with case a.....	\$15. 00
1 pair proportional dividers, 9 $\frac{1}{2}$ -inch, with micrometer adjustment, in case, No. 788.....	17. 00
1 set (16) irregular curves, assorted.....	. 30
1 beam compass, micrometer adjustment, with morocco case, No. 770.....	5. 95
2 bars, wood, for beam compass, 30 and 70 inches, No. 2280 (30-inch, 20 cents; 70-inch, 80 cents).....	
2 detail pens, 6 $\frac{1}{2}$ -inch, flat handle, No. 813.....	. 55
2 drawing pens, ebony, 5 $\frac{1}{2}$ -inch, No. 521 $\frac{1}{2}$	1. 08
1 8-inch German-silver circular protractor, with mahogany case, $\frac{1}{2}$ -inch, degree to minute, 6-inch arm, No. 1216.....	14. 75
2 triangular metal chain scales, engineers, 12-inch, 10-60, No. 1641.....	1. 65
2 flat boxwood scales 12-inch, $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ 1 inch, No. 1606.....	. 38
2 hard-rubber triangles, 18-inch, 30 by 60°, No. 1802.....	1. 38
2 hard-rubber triangles, 16-inch, 30 by 60°, No. 1802.....	1. 25
2 hard-rubber triangles, 6-inch, 30 by 60°, No. 1802.....	. 20
3 hard-rubber spines, 42-inch, No. 1836.....	. 28
8 lead spline weights, No. 2186.....	. 50
1 T-square, ebonized, shifting head, 36-inch, No. 1960.....	2. 00
1 T-square, ebonized, 24-inch.....	1. 25
3 horn centers, German-silver rim, $\frac{1}{4}$ -inch diameter, No. 2601.....	1. 25
1 Arkansas oilstone and cover, 6-inch, No. 2721.....	1. 50
1 steel straight edge, square edges, nickeled, 2 $\frac{1}{2}$ by 60 inches, No. 2020.....	6. 00
1 steel measuring rule or straight edge, nickeled, one edge beveled, 2 $\frac{1}{2}$ by 60 inches, divided from 0 to 60 inches into tenths, $\frac{1}{4}$ inch thick; accurately divided, No. 2080.....	11. 00
1 blue-print apparatus, plate glass and pad, 30 by 42 inches (or larger if the necessities of the post demand it).....	14. 75
1 zinc tray for use with blue-print apparatus 30 by 42 inches (or larger if the necessities of the post demand it).....	8. 00
1 hard-rubber straight edge, 42 inches, No. 1980.....	1. 15
2 curved pens, 4 $\frac{1}{2}$ -inch, No. 696.....	1. 00
1 dotting pen, six wheel (No. 651).....	2. 75
Miscellaneous instruments:	
2 hand magnifying (reading) glasses per company of seacoast artillery.....	2. 30
3 time-interval recorders (stop watches (Marlboro) recording fifths of a second) for each company of seacoast artillery at post.....	11. 00
Materials (one year's supply):	
1 roll, 20 yards, white drawing paper, mounted, best quality, 62-inch.....	. 70
2 rolls, 24 yards each, tracing linen, 54 or 62 inches wide.....	. 50
1 roll, 5 yards, cross-section paper, unmounted, orange, 10 by 10, 20 inches wide.....	. 11
1 roll, 100 yards, simplex detail paper, 54 inches wide.....	. 04
6 bottles indelible colored ink (Higgins), blue, brown, green, carmine, yellow, scarlet, together with tray to hold same.....	. 20
12 bottles waterproof ink (Higgins), black, indelible.....	2. 04
2 bottles liquid photodrawing ink.....	. 25
3 dozen drawing pencils, best grade, 4 H, 6 H, 7 H.....	. 82
6 dozen thumb tacks, $\frac{1}{4}$ -inch.....	. 10
1 dozen detail pencils, No. 3.....	. 68
1 roll, 50 yards, unprepared "Helios" medium blue-print paper, 42-inch.....	. 06
1 tin tube for blue-print paper, to hold roll of 50 yards.....	1. 50
2 dozen Gillott's pens, No. 303.....	. 06
2 dozen Gillott's pens, No. 404.....	. 06
1 dozen drawing and lettering pens, K. & E., card, No. 5208.....	. 32
1 dozen mapping pens, Gillott's, No. 5218.....	. 32
2 sponge rubbers, 4 by 2 by 1 inches.....	. 30
1 dozen rubbers, pencil.....	. 10
1 dozen rubbers, ink.....	. 08
1 square foot of pear wood for making curves.....	
3 bottles Helios erasing fluids, No. 240 W, No. 240 R, No. 240 Y.....	. 15
1 box round writing pens, No. 3838.....	. 25
1 supply of chemicals, with directions, sufficient for 50 yards of blue-print paper.....	
1 hard-wood chest for drawing material.....	

NOTE.—The numbers given in this list refer to the catalogue of Keuffel & Esser, and the material furnished will be as nearly similar as the laws and regulations for purchases will permit.

a The component parts of a set of standard drawing instruments and their cost is as follows:

Hair-spring dividers, No. 608.....	\$2. 20	Drawing pen, 4 $\frac{1}{2}$ -inch, No. 522.....	\$0. 69
Compass, 6-inch, No. 610.....	4. 80	Drawing pen, 5 $\frac{1}{2}$ -inch, No. 523 $\frac{1}{2}$.....	. 85
Bow divider, 3 $\frac{1}{2}$ -inch, No. 480.....	1. 26	Lead box, No. 660.....	. 18
Bow pen, 3 $\frac{1}{2}$ -inch, No. 481.....	1. 57	Case.....	2. 50
Bow pencil, 3 $\frac{1}{2}$ -inch, No. 482.....	1. 57		

MEMORANDUM.

In accordance with the provisions of the Adopted System of Fire Control and Direction there will be issued by the Ordnance Department the necessary material

for the preparation of battle charts. There has been adopted for issue for this purpose the following, constituting one set of water-color materials, to wit:

1 tin box, japanned, K. & E. No. 2954.	12 water colors—Continued.
12 water colors, full pans, one each:	Vermillion K. & E. No. 2920.
Burnt sienna.	Carmine lake.
Burnt umber.	Sepia K. & E. No. 2921.
Chrome yellow.	6 brushes, camel's hair, Nos. 1 to 6 K. &
Gamboge.	E. No. 3132.
Indian red.	1 architect's slant and basin, K. & E. No.
Indigo.	3169 (or 2 nests, 4 each, of cabinet
Neutral tint.	saucers, No. 3166 K. & E., whichever
Paynes gray.	may be preferred by requiring offi-
Prussian blue.	cer).

One set to be issued to each company of coast artillery, the colors to be renewed from time to time as required.

If any instruments or materials are required in excess of the above, the special necessity therefor must be stated in the requisition.

In addition to the drawing materials enumerated there are issued to seacoast posts chalk and lithite paint for plotting boards in the following quantities per annum:

Chalk (white crayons) 4 gross per annum. (50 cents per gross.)

Lithite paint, 1 quart per plotting board per annum. (3½ cents per pound.)

The lithite paint will not be issued after the permanent installation at any post of the Whistler plotting boards.

CHAPTER IX.

SIGHTS.

For full and complete description of all the various sights, see Handbook on Sights for Cannon, Ordnance Department, 1903, issued by the Ordnance Department, U. S. Army.

The component parts of the various sights issued to the service are as follows:

1.65-INCH HOTCHKISS MOUNTAIN GUN.

Front sight.—Consists of a plain roughened steel point, permanently fixed to the right rimbase. Price, — each.

Rear sight.

	Material.	Price.
Vertical limb (with scale of degrees).....
Deflection slide (graduated).....
Deflection slide clamp nut.....
Total.....	\$12.00

2.95-INCH (75 MILLIMETERS) VICKERS-MAXIM MOUNTAIN GUN.

Front sight.—Consists of a triangular pyramid on small arm with curved base and fastened to the cradle near the muzzle of gun by two screws. Price, — each.

Rear sight.

	Material.	Price.
Vertical limb.....
Graduated strip:
12½ pounds, muzzle velocity 918 feet per second.....
20 pounds, muzzle velocity 728 feet per second.....
Rack.....
Rack pinion.....
Elevation slide.....
Elevation pinion.....
Sighting leaf.....
Deflection screw.....
Total.....	\$38.00

3-INCH HOTCHKISS MOUNTAIN GUN.

Front sight.—Is made of cast iron with two branches formed on the arc of a circle, points coming nearly together at the top of sight. Price, \$5.40 each.

Rear sight.

	Material.	Price each.
Vertical limb (graduated with scale of degrees).....
Deflection slide (graduated).....
Deflection slide clamp nut.....
Total.....	\$23.75

3.2-INCH AND 3.6-INCH B. L. RIFLES.

Front sight.

	Material.	Price.	
		3.2	3.6
Body			
Cross carrier			
Cross			
Clamping screw			
Direction sight			
Total		\$6.00	\$6.00

The latest model of these sights differ from the earlier models only in the additional strength to resist bending, given to the body by the substitution for the two cuts of a single vertical cut.

Rear sight.

	Material.	Price.	
		3.2	3.6
Graduated vertical limb			
Base			
Trunnion			
Deflection scale			
Level (spirit)			
Deflection screw			
Elevating screw			
Sighting leaf			
Vernier			
Adjusting screw of spirit level			
Trunnion clamping screw			
Seating pin			
Total		\$20.00	\$21.00

The latest model has a wider slot, a modified peephole, stronger brass tube for level, a more efficient trunnion clamping screw, a time-scale graduation, and a deflection scale, showing thousandths of range.

5-INCH B. L. SIEGE RIFLE.

Front sight.

	Material.	Price.
Body		
Cross-carrier		
Cross		
Clamping screw		
Direction sight		
Total		\$6.50

Rear sight.

	Material.	Price.
Graduated vertical limb		
Base		
Trunnion		
Deflection scale		
Level (spirit)		
Deflection screw		
Elevating screw		
Sighting leaf		
Vernier		
Adjusting screw of spirit level		
Trunnion clamping screw		
Seating pin		
Total		\$25.00

Rear sight not graduated for range or time.

3.6-INCH B. L. FIELD MORTAR.

Front sight.—The front sight consists of a steel point fixed at the muzzle.

Pointing scale.—This is used to give deviations with the field mortar, and consists of a wooden rod 22 inches long, with a brass lug at one end. One side is graduated the length of scale, unit of scale being one one-thousandth of the range. Smallest reading is $2/1000=1/500$.

A brass index carrying clamp screw and point slides in grooves on the rod.

Parts.	Price.
Graduated scale.....
Brass index.....
Brass index clamp screw.....
Brass index point.....
Total.....	\$6.75

Gunner's quadrant.

No.	Official name of part.	Material.	Price.		
			1892.	1897.	1898.
1	Frame, with arc graduated in degrees and provided with toothed circular rack.	Bronze	.....	.....	.....
1	Arm (hollow and graduated) .....	.....	.....	.....	.....
	Movable arm, graduated in minutes:	.....	.....	.....	.....
	Spindle.....	.....	.....	.....	.....
	Sector.....	.....	.....	.....	.....
	Spiral spring.....	.....	.....	.....	.....
1	Sliding level.....	.....	.....	.....	.....
1	Set screw for sliding level.....	.....	.....	.....	.....
4	Plates and screws for shoeing feet of quadrant.....	Steel	.....	.....	.....
	Total.....	.....	\$12.15	\$13.38	\$16.00

The model 1897 is the same design as the 1892, with the following modifications:

Brass frame is made heavier, the better to withstand the accidents of service. The housing of the leaf is heavier, and feet are shod with steel plates held fast to the bronze frame by dovetailing and by screws. The quadrant, model 1898, has the following essential differences. The frame is of aluminum, and the feet are shod with steel plates as in the model 1897. The arc is graduated on both sides of frame for a maximum of 66 degrees of elevation or depression. This new model has a stronger and improved level. The mode of setting this quadrant for a given reading is the same as in the other models using graduations on either side of frame. Its use is simplified in that it is only necessary to place it on its side with the arrow indicating "line of fire" elevation or "line of fire" depression, as the case may be, pointing toward the target.

7-INCH B. L. HOWITZER.

Front sight.

	Price.
Sighting leaf.....	.....
Sighting leaf clamp screw.....	.....
Base.....	.....
Total.....	\$12.50

Rear sight.

	Price.
Base.....	
Vertical limb.....	
Collar.....	
Collar clamping screw.....	
Deflection scale.....	
Deflection scale clamp screw.....	
Head.....	
Sighting leaf.....	
Sighting leaf clamp screw.....	
Cross wires.....	
Total.....	\$40.50

REAR SIGHT 7-INCH B. L. HOWITZER (NEW MODEL).

	Price.
Carrier bracket and vernier.....	
Sighting leaf.....	
Cross wires.....	
Deflection scale.....	
Deflection scale clamp screw.....	
Vertical limb and trunnion.....	
Trunnion clamp screw.....	
Level (spirit).....	
Trunnion block.....	
Base.....	
Total.....	\$40.50

Both sights adaptable for either direct or reverse laying.

8-INCH CONVERTED M. L. RIFLE.

Front sight.

	Price.
Base.....	
Head.....	
Cross wires.....	
Cross carrier.....	
Direction sight.....	
Total.....	\$6.00

Rear sight (side).

	Price.
Graduated vertical limb.....	
Elevating screw.....	
Trunnion.....	
Trunnion clamp screw.....	
Deflection scale.....	
Deflection scale clamp screw.....	
Base.....	
Spirit level.....	
Sighting leaf.....	
Total.....	\$21.00

327

8-INCH B. L. RIFLE.

Front sight.

	Price.
Base	
Head	
Cross wires	
Cross carrier	
Direction sight	
Total	\$20.00

Rear sight (side).

	Price.
Direction sight	
Clamping screw	
Horizontal limb and deflection scale	
Spring stop pin	
Vertical limb	
Vernier	
Base	
Worm	
Elevating-wheel shaft	
Miter gear	
Elevating wheel	
Total	\$100.00

10-INCH B. L. RIFLE.

Front sight.

	Price.
Base	
Head	
Cross wires	
Cross carrier	
Direction sight	
Total	\$19.50

Rear sight (side).

	Price.
Direction sight	
Clamping screw	
Horizontal limb and deflection scale	
Spring stop pin	
Vertical limb	
Vernier	
Base	
Worm	
Elevating wheel shaft	
Miter gear	
Elevating wheel	
Total	\$106.00

12-INCH B. L. RIFLE.

Front sight.

	Price.
Base	
Head	
Cross wires	
Cross carrier	
Direction sight	
Total	\$19.00

Rear sight (side).

	Price.
Direction sight	
Clamping screw	
Horizontal limb and deflection scale	
Spring stop pin	
Vertical limb	
Vernier	
Base	
Worm	
Elevating wheel shaft	
Miter gear	
Elevating wheel	
Total	\$106.00

* The price of rear sights for 8, 10, and 12-inch B. L. rifles is the same for curved or flat brackets.

The brackets for the side sights of 8, 10, and 12 inch B. L. rifles are of two patterns, curved and flat. In making requisition for side sight the style of bracket required for the rifle should be stated.

TELESCOPIC SIGHTS.

Telescopic sights in the service are the models 1896 and 1896 M (designed and constructed by Col. L. K. Scott, of the English army), and models 1897, 1898, and 1898 M, O. D. sights.

	Price each.
The component parts of the model 1896 and 1896 M1 sights are as follows:	
.....	
.....	
.....	
.....	
Total: Model 1896, \$50; Model 1896, M1, \$106.50.	
The component parts of the model 1897 sight are as follows:	
Sight trunnions	
Leveling lug	
Telescope level	
Eye piece	
Focusing collar	
Dew cap	
Deflection screw	
Micrometer elevating worm spindle	
Cross level	
Vernier piece	
Axis of revolution	
Horizontal axis	
Total	125.00

	Price each.
The component parts of the model 1896 and 1898 M sights are as follows:	
Sight trunnions	
Leveling lug	
Telescope level	
Eye-piece	
Focusing collar	
Dew cap	
Micrometer deflection screw	
Micrometer elevating worm spindle	
Cross level	
Outside deflection scale	
Vernier piece	
Axis of revolution	
Horizontal axis	
Total	\$160.00
The component parts of the telescopic sight, model 1899, type "A," for R. F. Guns:	
.....	
.....	
.....	
.....	
.....	
.....	
.....	
Total	

The model 1896 M, telescopic, differs from the model 1896 in having—

1. A larger field of view.
2. A greater lateral movement of the sliding diaphragm.
3. A rocking worm spindle instead of a fixed one.
4. The deflection scale has every tenth subdivision numbered with its proper 30' and degree mark.

Power is 10 field 5° 5'.

Power of 1896 sight is 10 field 2° 50'.

The model 1896 M sight is being changed so as to conform in every essential feature with the model 1897 sight. The changes consist in new Brashear Hastings prisms, $\frac{1}{16}$ inch, mounted in frame, same to be dowel-pinned after adjusting, and provided with suitable metal cover; new eyepieces, power of 8, same as model 1897 sights, to avoid the difficulty of superimposed image; drift scale graduated in three-minute spaces to a distance of 2° 15' each side of center.

The telescopic sight, model 1897, differs from the 1896 model in having—

1. A noninverting telescope.
2. A larger field of view.
3. A larger objective, 1.2 inches.
4. A greater lateral movement of the sliding diaphragm.
5. A set of cross wires instead of pointers.

Power 19 field of view 5° 12'.

A set of open sights on the telescope acts as a finder for it.

The telescopic sight, model 1898, is a new design (designed and constructed by Messrs. Warner & Swasey, Cleveland, Ohio), similar to the earlier models in its method of attachment to the sight bracket, but differing from them in general construction and in the more important details. A complete description will be found in the Handbook on Sights, previously mentioned. Power 8 field of view 6°.

Telescopic sights, model 1898, Modified, are the same as model 1898, except that in order to obtain a more clearly defined image in all weathers the power is reduced to between 4 and 5. The field is increased to about 6° 30'.

These sights are issued 1 for each seacoast gun from calibers 5 to 12 inch, except the 4.72 and 6 inch Armstrong gun, and 3 to every battery of light artillery equipped

with 3.2-inch gun, and 2 to each battery of siege artillery. There are also issued 1 for each 6-pounder rapid-fire gun at seacoast fortifications. Also for the 15-pounder rapid-fire gun, 1 for each gun.

Each telescopic sight is provided with a sight retainer and band assembled to the sight. This is for the purpose of attaching the sight to the sight holder, to prevent it from being jarred from its position by the firing of the gun.

To prevent breaking of the index when the micrometer screw is turned too far, a stop has been placed upon the micrometer slide of telescopic sight to limit its motion, so that the index pointer can not strike the frame carrying the horizontal wire. All sights in service will be so altered whenever turned in for repairs.

The ring for holding platinum cross wires is, in all sights of recent manufacture, provided with four clamps for fastening the wires in place, and makes the matter of replacing broken wires comparatively simple and readily accomplished at the post. Extra wires will be issued for these sights upon requisition as required.

Ordinarily, the model 1897 sight is issued only for field service, for which it is better adapted than the model 1898.

TELESCOPIC SIGHT FOR 15-POUNDER RAPID-FIRE GUN.

The telescopic sight issued for the 15-pounder rapid-fire gun is designated as "Model 1899, Type A, for R. F. guns." It differs materially from all previous models. Instead of being pivoted to a trunnion casting, by which it may be adjusted in its seat or bracket and which permits elevation to be given, the telescopic tube consists of a substantial bronze casting provided on its under side with two lugs. These lugs rest on and inclose the ends of a flat machined seat on the shoulder bar of the mount. The sight is secured in place by two thumbcrews, one on the left side of each lug which bear against the undercut side of the seat. The telescope is provided with a set of open sights to serve as a finder.

The field of eyepiece of telescope is $26\frac{1}{2}$ degrees; the power, $3\frac{1}{2}$ degrees; field of view, $7\frac{1}{2}$ degrees; diameter of objective, $1\frac{1}{2}$ inches.

The telescope is noninverting, but the erect image is obtained by the use of an erecting eyepiece instead of prisms.

The line of sight is seven-eighths of an inch above the plane of the seat, 8 inches above axis of gun, and 10 inches to the left of axis of gun. The objective is $2\frac{1}{2}$ inches in front of end of seat. The eye lens is $3\frac{1}{2}$ inches in rear of end of seat.

NIGHT SIGHTS.

Night sights have been designed for the 15-pounder, 5-inch, and 6-inch R. F. guns. The principal component parts of a set of these sights are as follows:

For 15-pounder guns.

	Price.
1 sight rod.....
1 front sight holder.....
1 rear sight.....
2 cables with plug connections.....
3 incandescent lamps.....
1 battery box.....
3 dry cells.....
2 rheostats with plug connections.....
Total

For 5-inch R. F. gun.

	Price.
1 front sight fitting.....	
1 glass cone.....	
1 lamp holder (front sight).....	
2 ebonite connection with split points.....	
2 incandescent lamps.....	
1 rear sight lamp holder.....	
2 cables with plug connections.....	
1 battery box.....	
8 Leclanche's cells.....	
2 adjustable resistances.....	
Total.....	

For 6-inch R. F. gun.

(The parts of this sight will be furnished later.)

There are issued with the 15-pounder, 5-inch, R. F. gun night sights the following spare parts, material, etc. (estimated to be one year's supply), additional quantities being issued from time to time as needed:

15-pounder sight.		5-inch sight.	
	Price.		Price.
1 cable with plug connection.....		1 glass cone.....	
2 incandescent lamps (ruby).....		4 incandescent lamps.....	
2 incandescent lamps (clear).....		1 cable complete.....	
1 dry cell (O. K.).....	\$0.27	1 cell (Leclanche).....	\$0.27

Night sights for the 8, 10, and 12 inch guns have not as yet been designed, but that work is in hand and will be completed in the near future.

TELESCOPIC SIGHT BRACKETS.

The telescopic sight brackets are attached to the guns and carriages of the various field and seacoast guns by means of bronze brackets and in the manner following:

Gun.	Mounted upon—	Bracket	Bracket attached to—
3.2-inch B. L. R., field.....	Field carriage.....	Same for both	} Right trunnion.
3.6-inch B. L. R., field.....	do.....		
5-inch B. L. R., siege.....	Siege carriage.....	Same for both	
7-inch B. L. Howitzer, siege.....	do.....		
6-inch R. F., models 1897 and 1897 M1.			
8-inch B. L. R., model 1888..	Barbette carriages	Same for all, attached by 4 screws.	
10-inch B. L. R., model 1888..			
12-inch B. L. R., model 1888..			

Gun.	Mounted upon—	Bracket.	Bracket attached to—
8-inch B. L. R., model 1888. 10-inch B. L. R., model 1888 or 1896. 12-inch B. L. R., model 1888 or 1896.	Disappearing car- riages, models 1894 and 1896.	Same for all. (It is called a sight- holder.)	Chassis stand- ard.
8-inch B. L. R., model 1888. 10-inch B. L. R., model 1888. 12-inch B. L. R., model 1888. 8-inch B. L. R., model 1888. 10-inch B. L. R., model 1888 or 1896.	Barbette and gun- lift carriages.	Same for all (long bracket); attached by 6 screws.	Right trunnion.
12-inch B. L. R., model 1888 or 1896.	Disappearing car- riage.	Same for all (long or short bracket); long is same as above; short is attached by 4 screws.	Do.

The sight-bracket adjusting screws are the same for all brackets.

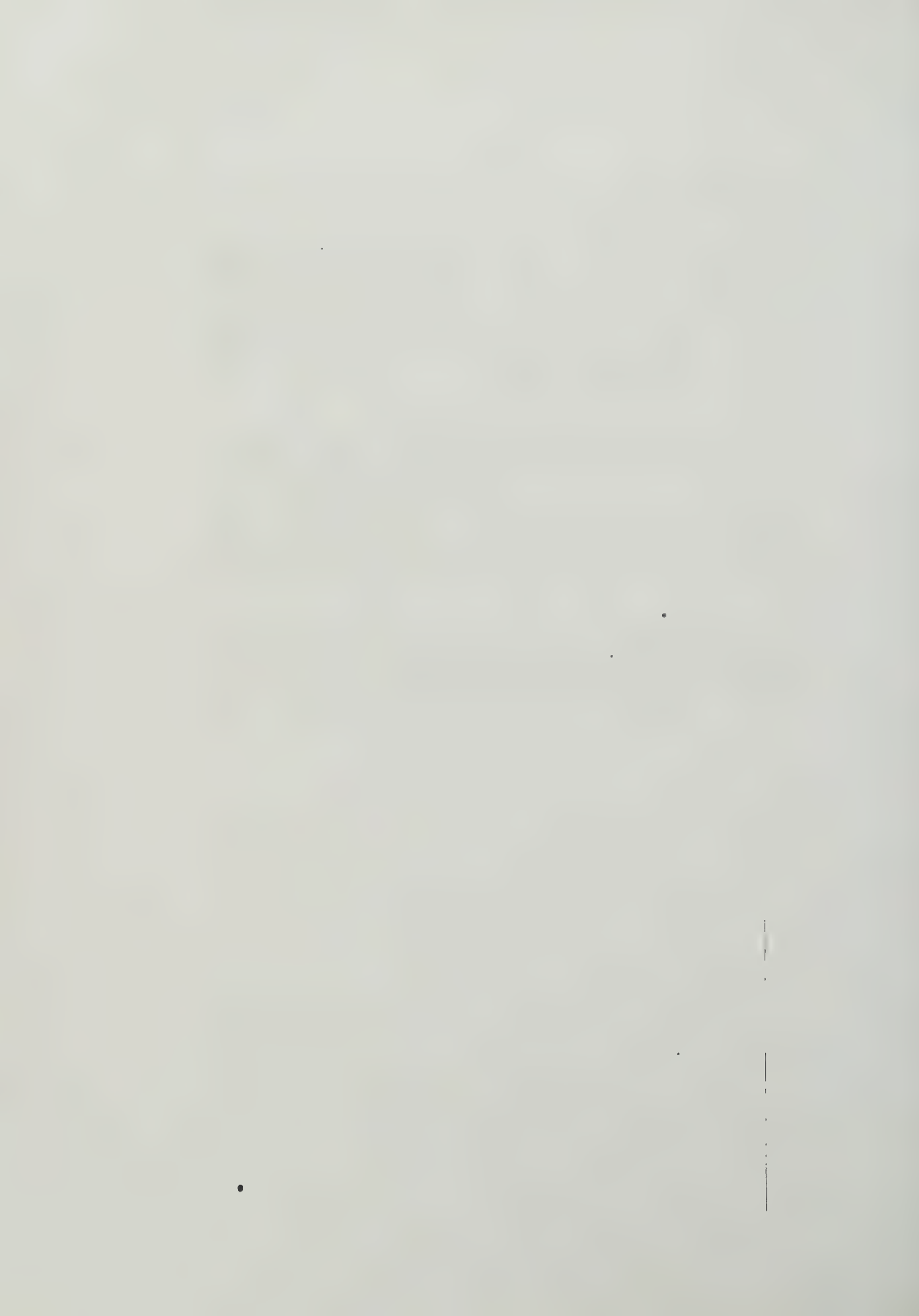
In making requisition for sight brackets for field guns the model of the gun and the carriage upon which it is mounted should be given, also the number of screw required to attach it to the gun or carriage.

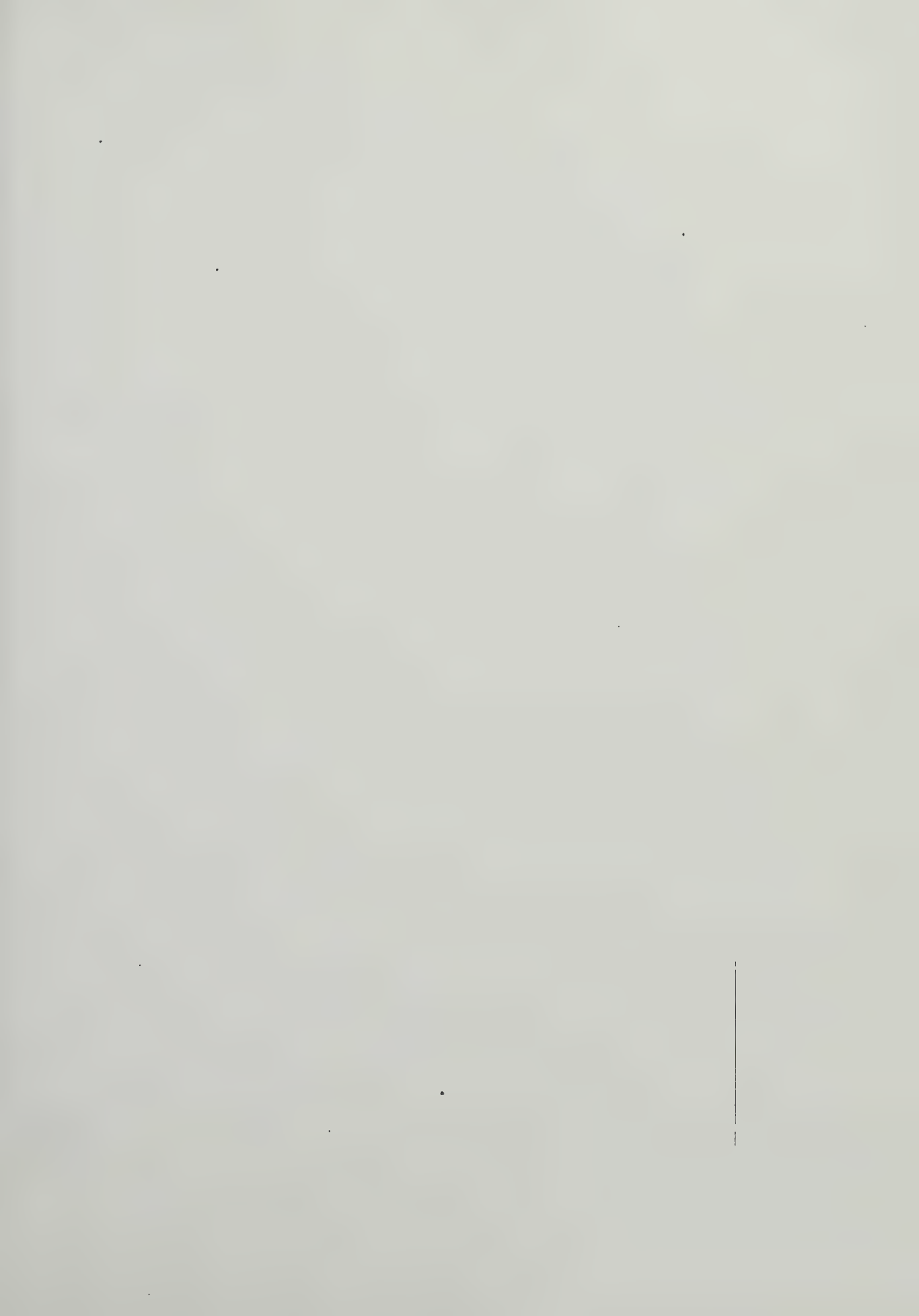
In making requisition for sight brackets for seacoast guns the model of the gun and its carriage should be given. It should also be stated whether or not the bracket is to be attached to the gun or carriage.

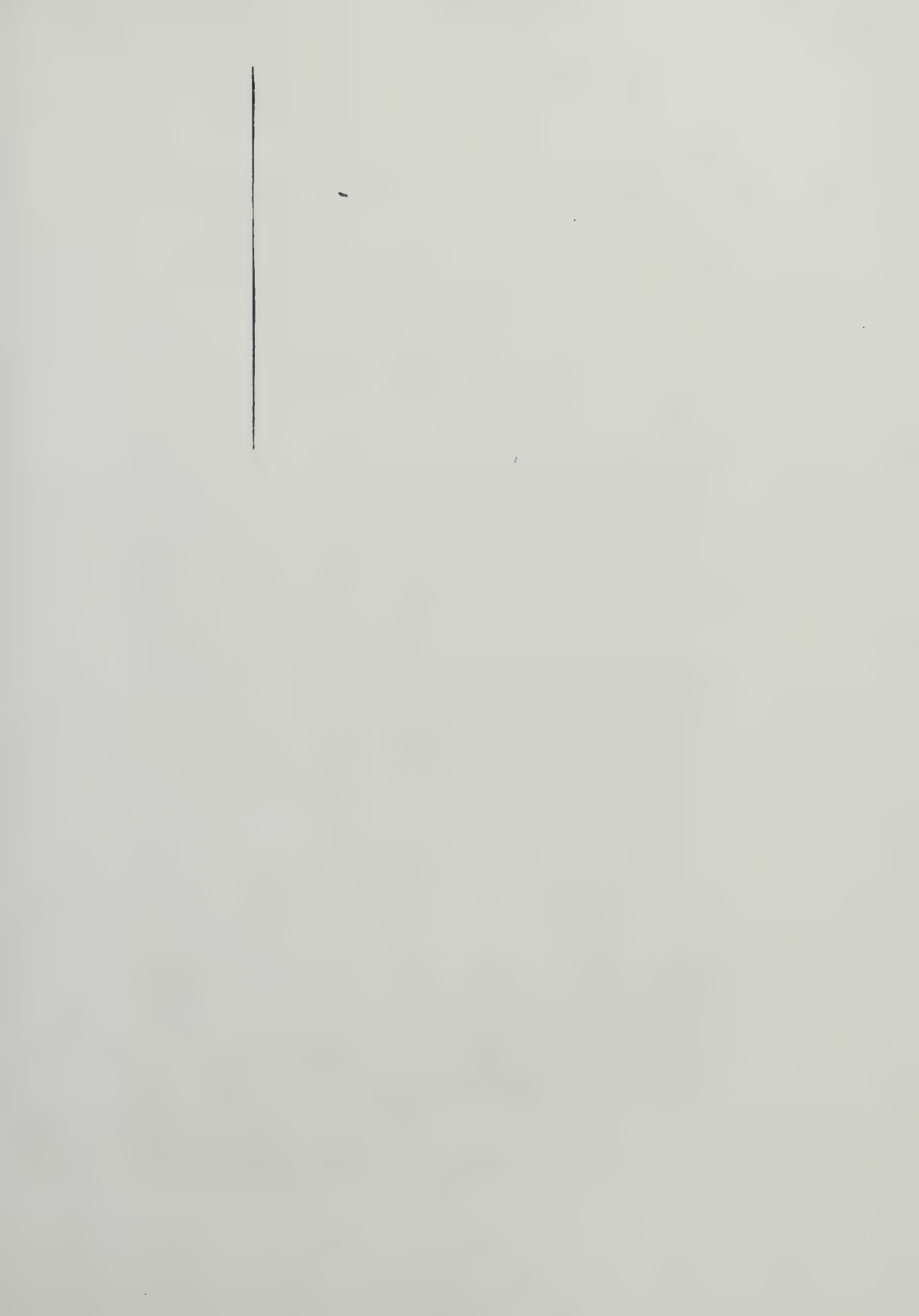
In making requisition for sight-bracket screws state fully the kind of bracket in which they ought to be used.

TRIPOD MOUNT FOR TELESCOPIC SIGHTS.

The Ordnance Department has under test a tripod mount for the use of posts with telescopic sights for instruction purposes. The tripod is similar to that furnished for the Warner & Swasey azimuth instruments, and after the model has been definitely determined for issue, description of same will be furnished.







CHAPTER X.

AMMUNITION, FUSES, AND PRIMERS.

Smokeless powder is the service powder used for all calibers of guns and small arms, except for the short ranges in the various zones of fire of the 12-inch B. L. mortars, for which purpose the spherohexagonal powder is used pending the adoption of a smokeless powder that will answer as well at these ranges for these guns. A limited quantity of brown prismatic powder for 8, 10, and 12 inch B. L. rifles still remains on hand and is being used for service-charges in firing necessary rounds, for tests of armament during visit of inspectors, with these guns until the supply is exhausted, when smokeless powder will be exclusively used for all charges. A large quantity of brown prismatic powder remains on hand for the 12-inch B. L. mortars and the charges for the 6th, 7th, 8th, 9th, and 10th zones, as provided by General Orders, will be of this powder until same is exhausted.

All powder charges for seacoast and field guns will be issued fully prepared for service from the United States powder depot at Dover, N. J., and Benicia Arsenal, Cal. The weights of charges of various lots of powder vary to such a degree that this method is necessary, and smokeless powder will not be issued in bulk to posts.

For the 12-inch B. L. mortars the charges have been determined for the following zones of fire (the spherohexagonal charges to be made up at post if powder be on hand, otherwise to be issued made up) and will be issued upon requisition specifying zones for which required. (See G. O. 99, A. G. O., 1903.)

No. of zone.	Powder charge, 12-inch B. L. M., steel.			Powder charge, 12- inch B. L. M., C. I. S. H.		Muzzle velocity.	Zone limits.	Breadth of zones.		Overlaps.	Limiting elevations.
	Sp. hex.	Smoke- less ^a	Brown prismatic.	Sp. hex.	Brown prismatic.			Yds.	Yds.		
1	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	F. S.	Yds.	Yds.	Yds.	° ' ° '	
2	34.00	.....	.....	26.75	.....	620	3,000 to 3,600	800	200	60 14 to 47 38
3	36.75	.....	.....	30.00	.....	660	3,400 to 4,100	700	200	60 20 to 46 45
4	41.90	.....	.....	33.80	41.87	707	3,900 to 4,700	800	300	60 00 to 45 00
5	46.40	.....	.....	.....	46.13	753	4,400 to 5,300	900	300	60 00 to 46 00
6	51.20	.....	.....	.....	51.20	804	5,000 to 6,000	1,000	400	59 50 to 45 00
7	.....	33.00	62.00	.....	56.40	853	5,600 to 6,700	1,100	400	59 37 to 45 00
8	.....	36.40	70.00	.....	63.50	917	6,300 to 7,600	1,300	500	59 51 to 45 00
9	.....	36.27	77.50	.....	70.63	980	7,100 to 8,500	1,400	500	59 35 to 46 00
10	.....	43.14	87.50	.....	82.97	1,066	8,000 to 9,600	1,600	600	59 38 to 45 00
11	.....	47.92	100.00	.....	86.5	1,148	9,000 to 10,800	1,800	600	59 50 to 46 00
	.....	51.60	.....	.....	88.5	1,220	10,000 to 11,900	1,800	800	59 17 to 45 00

^a Each smokeless-powder cartridge to have 10-ounce igniter (black rifle powder) at each end in addition to above charges.

^b Smokeless-powder charges.

NOTE.—All smokeless-powder charges for mortars will be issued made up, ready for use, as the charges vary with each lot of powder.

Artillery district commanders will determine the proportion in which the supply of ammunition for mortars shall be provided for each zone for each battery. (Cir. 43, A. G. O., 1902.)

If it be found necessary to increase or reduce the weight of any of the charges, the instructions given in the pamphlet *Instructions for Regulating Powder Charges of Coast Artillery in Target Practice* issued by the Ordnance Department will be followed. (G. O. 99, A. G. O., 1903.)

All charges of smokeless powder issued for service or practice charges are marked, giving the kind of powder, lot number, etc., in the following manner:

RESERVE AMMUNITION.

For (8-inch, 10-inch, or 12-inch) gun.

Kind of powder.

Lot of powder.

Make.

Initial velocity.

Weight of charge.

Date of issue.

TARGET-PRACTICE AMMUNITION.

For (8-inch, 10-inch, or 12-inch) gun.

Kind of powder.

Lot of powder.

Make.

Initial velocity.

Weight of charge.

Date of issue.

RESERVE AMMUNITION.

For 12-inch B. L. mortar (C. I. S. H. or steel).

Kind of powder.

Lot of powder.

Make.

Initial velocity.

Weight of charge.

Range.

Date of issue.

Powder charges should be so arranged in storage magazines that the marks on cases can be readily seen at all times, to permit of the use of the earlier issues of charges first.

In taking up powder charges on post property returns they should be taken up under the various calibers by lot numbers, i. e.:

SMOKELESS POWDER.

8-inch B. L. rifles.

D. Lot 1—1901.

Chg. 72 lbs.; vel. 2,200 F. S.

8-inch B. L. rifles.

D. Lot 5—1900.

Chg. 12 lbs.; vel. 1,300.

The following table gives the average weights of full charges, the maximum muzzle velocities, and the corresponding pressures for the service breech-loading pieces:

Seacoast pieces.	Powder chamber.			Average powder charge. ^a		Projec- tile.	Muzzle veloc- ity.	Pres- sure per square inch.
	Diam- eter.	Length.	Capacity.	Kind.	Weight.			
	<i>Inches.</i>	<i>Inches.</i>	<i>Cubic in.</i>		<i>Lbs. oz.</i>	<i>Lbs.</i>	<i> Ft. sec.</i>	<i>Lbs.</i>
6-pounder R. F.	2.55	9.55	47.3	Smokeless..	0 19	6	2,400	33,500
16-pounder R. F.	3.51	21.00	201.5	.....do.....	4 11	15	2,600	33,500
4-inch R. F. (Driggs- Schroeder).			362.7	Brown pris.	13 4	33	2,000	34,000
4.724-inch R. F. 40-cal- iber (Armstrong).	4.70	15.30	320.0	Smokeless..	5 8	45	2,150	32,000
4.724-inch R. F. 46-cal- iber (Armstrong).	4.70	25.00	500.0	.....do.....	8 2	45	2,576	35,000
6-inch R. F. (Armstrong).	6.15	22.40	871.0	.....do.....	13 4	100	2,154	32,000
6-inch R. F.	5.50	27.50	660.0	.....do.....	16 0	55	2,600	35,000
6-inch R. F.	7.00	33.40	1,278.0	.....do.....	28 0	100	2,600	35,000
8-inch B. L. R.	9.50	51.00	3,619.0	.....do.....	76 0	300	2,250	37,000
				Brown pris.	135 0	300	1,975	38,000
10-inch B. L. R.	11.80	65.50	7,123.0	Smokeless..	150 0	575	2,300	37,000
				Brown pris.	280 0	575	2,025	38,000
12-inch B. L. R.	14.20	77.40	12,185.0	Smokeless..	270 0	1,000	2,300	37,000
				Brown pris.	490 0	1,000	2,025	38,000
12-inch B. L. mortar, cast iron, hooped.	12.40	16.00	2,021.0	Smokeless..	41 8	800	1,200	26,000
12-inch B. L. mortar, steel.	12.50	21.10	2,676.0	Brown pris.	75 0	800	1,020	27,500
				Smokeless..	57 0	800	1,325	33,000
				Brown pris.	106 0	1,000	1,020	33,000

^a The weights of charges vary for different lots of powder.

If charges are to be made up at a post from a lot of powder of which the proof velocity is not known it should be obtained by application to the Chief of Ordnance.

The igniter for each Armstrong charge (4.72 or 6 inch) is 1.25 ounces of black rifle powder. For other smokeless powder charges the igniters of black rifle powder are as follows:

Piece.	For nitro- glycerin powders.	For nitro- cellulose powders.	Distribution.
	<i>Ounces.</i>	<i>Ounces.</i>	
6-pounder R. F.	0.5	0.5	One-half at each end of charge.
16-pounder R. F.	1.0	2.0	Do.
5-inch R. F.	5.0	6.0	Do.
6-inch R. F.	5.0	12.0	Do.
4-inch B. L. R.	12.0	24.0	One-fourth at each end of each of the 2 sections.
10-inch B. L. R.	20.0	64.0	Do.
12-inch B. L. R.	36.0	114.0	One-eighth at each end of each of the 4 sections.
12-inch B. L. M.	8.0	20.0	One-half at each end of charge.

For brown prismatic powders either one of two forms of igniter may be used, namely:

(1) Seven black prisms in the center of the bottom layer of each section of the cartridges.

(2) About 2 ounces of rifle powder for the 8-inch and 3 ounces for the 10 and 12 inch sections.

The following densities of loading with smokeless powder should not be exceeded: For cordite, 0.5; for nitroglycerin powders, N. N. type, 0.60; and for nitrocellulose powders, in 6-inch and larger calibers, 0.65.

The dimensions of smokeless-powder cartridges made up with the average charges for cannon without cartridge case are approximately as follows:

Pieces.	Charge.	Cartridge (or section).		
		Number of sections.	Diameter.	Length.
	<i>Pounds.</i>		<i>Inches.</i>	<i>Inches.</i>
5-inch R. F.....	16.0	1	5.00	27
6-inch R. F.....	28.0	1	5.75	32
8-inch B. L. R.....	76.0	2	7.75	24
10-inch B. L. R.....	150.0	2	10.25	30
12-inch B. L. R.....	270.0	4	12.25	18
12-inch B. L. M., cast iron, hooped.....	41.6	1	10.25	16
12-inch B. L. M., steel.....	57.0	1	10.40	20

The following charges of high explosives have been adopted for the various projectiles named:

High-explosive charges maximite, etc., for shell and shot.

Caliber.	Bursting charge.
	<i>Pounds.</i>
12-inch A. P. shell, maximite.....	70
12-inch A. P. shell, maximite.....	23
10-inch A. P. shell, maximite.....	40
10-inch A. P. shell, maximite.....	15
8-inch A. P. shell, maximite.....	20
8-inch A. P. shell, maximite.....	8
6-inch A. P. shell, maximite.....	5
6-inch A. P. shell, maximite.....	2.5
6-inch A. P. shell, maximite.....	3
6-inch A. P. shell, maximite.....	1.5
12-inch mortar shell, D. P., 800-pound.....	39.5
12-inch mortar shell, D. P., 1000-pound.....	70
12-inch mortar shell, torpedo, 800-pound.....	121
12-inch mortar shell, torpedo, 1000-pound.....	151

The following table shows the kind of ammunition, etc., issued to the service for use with the respective rapid-fire guns:

Gun.	Powder chamber (or interior of case).				Projectile, a				Powder.					
	Form.	Diameter, aver- age.	Length.	Capacity.	Kind.	Weight, filled with powder.	Ratio of weight to weight of bullet in the powder.	Length.	Sectional density.	Travel of shot.	Kind.	Weight of charge.	Density of load- ing.	Maximum pres- sure per square inch.
8 pdr. (2.24-inch), Am. Ord. Co., Mark II.	Conical	2.50	10.237	50.0	Common shell Steel shell Canister shell	Lbs. 6 6 None	$\frac{1}{15}$ $\frac{1}{15}$ $\frac{1}{15}$	Cals. 3.7 3.7 3.7	1.53 1.53 1.53	101.840 101.760 do. b	{Black {Nitroglycerin b	Lbs. 1.87 1.25 1.25	1.0352 0.6920 0.6920	34,000 34,000 34,000
6 pdr. (2.24-inch), Driggs-Seabury (from gun No. 7 on).	do	2.50	10.237	50.0	Common shell Steel shell Canister	Lbs. 6 6 None	$\frac{1}{15}$ $\frac{1}{15}$ $\frac{1}{15}$	Cals. 3.7 3.7 3.7	1.53 1.53 1.53	101.760 do. b	{do. b	Lbs. 1.25 1.25 1.25	0.6920 0.6920 0.6920	34,000 34,000 34,000
15 pdr., 3-inch, Driggs- Seabury.	do	3.47	21.210	200.0	Common shell Steel shell Shrapnel	Lbs. 15 15 83	$\frac{1}{15}$ $\frac{1}{15}$ $\frac{1}{15}$	Cals. 3.7 3.7 3.0	2.12 2.12 2.62	128.630 128.630 132.120	Nitrocellulose b	Lbs. 5.00 5.00 12.00	0.6921 0.6921 1.0160	34,000 34,000 34,000
4-inch Driggs-Schroe- der.	do	4.06	25.300	363.0	A. P. Shell	Lbs. 83	$\frac{1}{15}$	Cals. 3.0	2.62	132.120	Sphero-hex	Lbs. 12.00	1.0160	34,000
4.72-inch Armstrong.	do	4.90	15.250	285.0	Cast iron	Lbs. 45	$\frac{1}{15}$	Cals. 3.0	2.57	172.871	Pebble	Lbs. 12.00	1.1655	34,000
4.72-inch Armstrong.	do	4.90	25.300	496.0	Steel shell	Lbs. 45	$\frac{1}{15}$	Cals. 3.0	2.57	181.496	Cordite b	Lbs. 13.60	0.7590	34,000
45 caliber.	do	4.90	25.300	496.0	Strong head	Lbs. 45	$\frac{1}{15}$	Cals. 3.0	2.57	181.496	Pebble	Lbs. 8.20	0.4576	34,000
4.72-inch Armstrong.	do	4.90	25.300	496.0	Shrapnel	Lbs. 45	$\frac{1}{15}$	Cals. 3.0	2.57	181.496	Cordite b	Lbs. 13.60	0.7590	34,000
50 caliber.	do	4.90	25.300	496.0	Shrapnel	Lbs. 45	$\frac{1}{15}$	Cals. 3.0	2.57	181.496	Pebble	Lbs. 8.20	0.4576	34,000
6-inch Ord. Dept., U. S. A.	Cylindrical	5.50	27.50	660.0	C. I. shell A. P. shell A. P. shot	Lbs. 55 55 55	$\frac{1}{15}$	Cals. 3.0 3.0 2.7	2.50 2.50 2.50	195.495 195.495 195.495	Nitrocellulose b	Lbs. 16.40 16.40 16.40	0.6878 0.6878 0.6878	38,000 38,000 38,000
6-inch Ord. Dept., U. S. A., Mod. 1897 M.	do	7.00	33.37	1,278.0	C. I. shot C. I. shell A. P. shell	Lbs. 100 100 100	$\frac{1}{15}$	Cals. 3.4 3.4 3.2	3.54 3.54 3.54	234.075 234.075 234.075	{do. b	Lbs. 23.70 23.70 23.70	0.6433 0.6433 0.6433	38,000 38,000 38,000
6-inch Ord. Dept., U. S. A., Mod. 1900.	Cylindrical	6.20	22.600	678.0	A. P. shot Shrapnel C. I. shell	Lbs. 100 100 100	$\frac{1}{15}$	Cals. 3.4 3.4 3.4	3.54 3.54 3.54	216.700 216.700 216.700	Cordite b	Lbs. 13.30 13.30 13.30	0.5490 0.5490 0.5490	34,000 34,000 34,000

^a Abbreviations.—C. I., cast iron; C. S., common steel; A. P., armor piercing.

^b Does not include igniting charge.

^c With fuse.

^d Maxillite or explosive D.

POWDER NOTE.—The weights of powder given are approximate. The exact weight, giving the standard muzzle velocity, is determined from the acceptance test and issue for charge.

MOUNTAIN ARTILLERY.

[illegible]

Powder.....	Kind.....	Black.....	Sphero-hex. field cannon.	Sphero-hex. field cannon.	Sphero-hex. field cannon.	Sphero-hex. field cannon.	Sphero-hex. field cannon.
		Smokeless.....	3.0" field gun.	3.0" field gun, model-els 1885 and 1890.	3.0" field gun, model-els 1885 and 1890.	3.0" field gun, model-els 1885 and 1890.	3.0" field gun, model-els 1885 and 1890.
	Weight (see note).....	Black.....	3.5	3.5	3.5	3.5	3.5
	Density of loading.....	Smokeless.....	0.9832	0.9832	0.9832	0.9832	0.9832

SIEGE ARTILLERY.

Powder chamber.....	Diameter.....	Length.....	Capacity.....	6-inch B. L. rifles.		7-inch B. L. howitzers.		7-inch B. L. mortar, model 1892.	
				Model 1890.	Model 1893.	Model 1890.	Model 1893.	Model 1892.	Model 1892.
Projectile.....	Kind.....	Weight, filled.....	Ratio, weight to weight of piece.....	Weight of bursting charge, rifle powder.....	Length.....	Sectional density $\frac{W}{V}$	C. I. shell.	Steel shell.	Sbr.
							125	125	125
Powder.....	Kind.....	Weight (see note).....	Ratio, weight to weight of piece.....	Weight of bursting charge, rifle powder.....	Length.....	Sectional density $\frac{W}{V}$	C. I. shell.	Steel shell.	Sbr.
							125	125	125

^a Ounces.^d Maximum: The weight of charge varies with the range; for issues in bulk the average charge is assumed to be three-fourths the maximum.^c Without fuse.

SEACOAST ARTILLERY.

Powder chamber	8-inch B. L. rifle, model 1888 M1.			10-inch B. L. rifles			12-inch B. L. rifle, model 1895 M1.			10-inch B. L. mortar, model 1890.			12-inch B. L. mortar, model 1896.			Steel, model 1890 M1.					
	Model 1888 M1.			Model 1888 M1.			Model 1895 M1.			Model 1890.			Model 1896.			Steel, model 1890 M1.					
	9.6 51.0 3.619	11.8 66.49 7.123	11.8 66.49 7.123	11.8 66.49 7.123	11.8 66.49 7.123	11.8 66.49 7.123	14.2 77.68 12.185	14.2 77.68 12.185	14.2 77.68 12.185	10.5 17.24 1.584	10.5 17.24 1.584	12.4 16.06 2.021	12.4 16.06 2.021	12.4 16.06 2.021	12.5 21.13 2.678	12.5 21.13 2.678					
Projectile	A. P. A. P. C. I. shot. shell. shot. 300 300 300			A. P. A. P. C. I. shot. shell. shot. 300 300 300			A. P. A. P. C. I. shot. shell. shot. 1,000 1,000 1,000			A. P. A. P. C. I. shot. shell. shot. 2,400 2,400 2,400			D. P. shell. 800 1,000 800			D. P. shell. 800 1,000 800			C. I. shell. 800 1,000 800		
	17 17 17			17 17 17			17 17 17			17 17 17			17 17 17			17 17 17			17 17 17		
	11.6 4.0 3.5 5.97			11.6 4.0 3.5 5.97			11.6 4.0 3.5 5.97			11.6 4.0 3.5 5.97			11.6 4.0 3.5 5.97			11.6 4.0 3.5 5.97			11.6 4.0 3.5 5.97		
	3.5 4.0 3.5 5.97			3.5 4.0 3.5 5.97			3.5 4.0 3.5 5.97			3.5 4.0 3.5 5.97			3.5 4.0 3.5 5.97			3.5 4.0 3.5 5.97			3.5 4.0 3.5 5.97		
	Brown pris			Brown pris			Brown pris			Brown pris			Brown pris			Brown pris			Brown pris		
Powder	8" B. L. rifle.			10" B. L. rifle.			12" B. L. rifle.			10" mortar.			12" mortar b or sleege gun and howitzer.			12" mortar b or sleege gun and howitzer.			12" mortar b or sleege gun and howitzer.		
	135.0 70.0 1.0321 0.5354			280.0 140.0 1.0886 0.5441			490 240 1.1133 0.5452			608.0 300.0 1.0722 0.5394			12" mortar b or sleege gun and howitzer. 4475.0 441.5 41.0732 0.5684			12" mortar b or sleege gun and howitzer. 4475.0 441.5 41.0732 0.5684			12" mortar b or sleege gun and howitzer. 4475.0 441.5 41.0732 0.5684		
	Weight (Brown).....lbs. see note (Smokeless). Velocity of Brown.....ft./sec. Velocity of Black.....ft./sec. Loading (Smokeless).....			Weight (Brown).....lbs. see note (Smokeless). Velocity of Brown.....ft./sec. Velocity of Black.....ft./sec. Loading (Smokeless).....			Weight (Brown).....lbs. see note (Smokeless). Velocity of Brown.....ft./sec. Velocity of Black.....ft./sec. Loading (Smokeless).....			Weight (Brown).....lbs. see note (Smokeless). Velocity of Brown.....ft./sec. Velocity of Black.....ft./sec. Loading (Smokeless).....			Weight (Brown).....lbs. see note (Smokeless). Velocity of Brown.....ft./sec. Velocity of Black.....ft./sec. Loading (Smokeless).....			Weight (Brown).....lbs. see note (Smokeless). Velocity of Brown.....ft./sec. Velocity of Black.....ft./sec. Loading (Smokeless).....			Weight (Brown).....lbs. see note (Smokeless). Velocity of Brown.....ft./sec. Velocity of Black.....ft./sec. Loading (Smokeless).....		

a Explosive D or maxinite.

b The kind of powder varies with the range.

c Maximum: The weight of charge varies with the range; for issues in bulk the average charge is assumed to be three-fourths the maximum.

d For 800-lb. shell.

e For 1,000-lb. shell.

The latest ballistic data with reference to various field, siege, rapid-fire, and sea-coast guns and mortars is as follows:

Guns.	Weight of charge.	Projectile.	Muzzle velocity.	Chamber pressure maximum.
	<i>Lbs. Oz.</i>		<i>F. S.</i>	<i>Lbs. per sq. in.</i>
1.457-inch (1-pounder) subcaliber tube	2½	1	2,100	25,000
2.95-inch subcaliber tube	7	18	750	18,000
Field guns, howitzers, and mortars:				
1.457-inch (1-pounder) Maxim quick-firing gun	1½	1	1,800	27,000
1.65-inch Hotchkiss B. L. rifle	2½	2	1,313	18,000
2.95-inch Vickers-Maxim mountain gun	8	12½	920	18,000
3-inch Hotchkiss B. L. rifle	7	18	750	18,000
3-inch B. L. field gun, model 1902	6½	12½	845	13,500
3.2-inch B. L. field gun	25	15	1,700	33,000
3.2-inch B. L. field gun	18	13½	1,695	35,000
3.6-inch B. L. field gun	28	20	1,550	35,000
3.6-inch B. L. mortar	6	20	690	17,000
Siege guns, howitzers, and mortars:				
5-inch B. L. field howitzer	25	55	1,000	23,000
5-inch B. L. siege gun	5 6	45	1,680	36,000
7-inch siege howitzer	4 8	105	1,100	28,000
7-inch B. L. siege mortar	2	125	710	20,000
Rapid-fire guns:				
2.24-inch (6-pounder) American Ordnance Company ..	1½	6	2,400	34,000
2.24-inch (6-pounder) Driggs-Seabury	1½	6	2,400	34,000
3-inch (15-pounder) Driggs-Seabury	5	15	2,600	34,000
4-inch Driggs-Schroeder		23	2,000	34,000
4.7-inch Armstrong, 40-caliber	7½	45	2,150	34,000
4.7-inch Armstrong, 45-caliber	10½	45	2,570	34,000
4.7-inch Armstrong, 50-caliber	10½	45	2,600	34,000
5-inch Ordnance Department, model 1897	16½	58	2,600	38,000
5-inch Ordnance Department, model 1900		58	3,000	38,000
6-inch Armstrong, 40-caliber	19	106	2,150	34,000
6-inch Ordnance Department, model 1897 M1	29½	106	2,600	38,000
6-inch Ordnance Department, model 1900	43	106	3,000	38,000
Seacoast guns and mortars:				
8-inch B. L. rifle	80	318	2,200	33,000
10-inch B. L. rifle, models 1888 and 1896	156	606	2,250	33,000
10-inch B. L. rifle, model 1900	245	606	2,550	38,000
12-inch B. L. rifle, models 1888 and 1896	275	1,048	2,250	38,000
12-inch B. L. rifle, model 1900	375	1,048	2,550	38,000
12-inch B. L. mortar, steel, models 1890 and 1890 M1 ..	62	827	1,325	33,000
	54	1,051	1,150	33,000
12-inch B. L. mortar, C. I., models 1886 and '86-'90 M1 ..	43	827	1,200	27,500
	43	1,051	1,020	27,500
15-inch B. L. rifle	660	2,400	2,300	38,000

a 12-inch B. L. mortar, model '86-'90 M1, is made of steel, but its ballistic qualities are the same as the C. I. mortars.

All ammunition issued for target practice for 6 and 15 pounder guns will be marked on the packing case "Target practice ammunition," and each round will also be stamped with the same information, to avoid confusion with service ammunition fully prepared.

For practice at moving targets shot or plugged shell only are allowed. Hence with projectiles which are separately loaded, if filled and fused shell only are on hand the fuses must be removed, the bursting charges withdrawn, and the latter replaced with sand to bring the shell up to its proper weight. The fuse hole should be closed with a brass screw plug, or in its absence the fuse may be reinserted. In case the work can not be done at the post with the appliances at hand the fact will be reported to the Chief of Ordnance. Fixed ammunition will be issued upon requisition, properly prepared for target practice.

In order that ammunition may be issued in accordance with requirements, requisitions must state in all cases whether fixed or moving targets are to be used. (G. O. 111, 1902.)

In uncrating cartridge storage cases take the screws out of the ends of two or more slats adjacent to one of the handles on the case and by means of the latter remove the case from the crate.

If cartridge storage cases are painted, paint should at no time be applied to the

rim of the top, to the soldering strip, nor to the body of the case within half an inch of the strip.

In crating cartridge storage cases the case is inserted by means of one of its handles in crates and the removed slats replaced and the screws reinserted.

All ammunition for field and siege guns (shell and shrapnel) to August, 1902, was packed and issued in complete rounds, viz., shell or shrapnel, powder charge, fuses, and primers. The fuses and primers being packed in separate (tin) hermetically sealed cases, as well as the powder charges. As the result of the modification of the fuses, all shrapnel and shell are now issued filled and fused.

In no case should smokeless powder be exposed to the sun for drying, but should be dried by exposure to a dry atmosphere under cover.

Nitroglycerin and nitrocellulose powders must not be blended. Each charge should be made up from a single lot of powder. Smokeless powders must not be used in any other gun than that for which they are designated.

Brown prismatic powders marked for one gun must not be used for any other caliber or a gun of different chamber capacity, as they differ in rate of burning for different guns, though the grain of all these powders is about the same size.

The following saluting charges for large-caliber breech-loading seacoast guns have been adopted for use, when specially ordered, to wit:

- 8-inch B. L. rifle, 12 pounds, bag 8-inch diameter filled.
- 10-inch B. L. rifle, 18 pounds, bag 9-inch diameter filled.
- 12-inch B. L. rifle, 30 pounds, bag 11-inch diameter filled.
- 12-inch B. L. mortar, 18 pounds, bag 10-inch diameter filled.

The diameters given for the cartridge bags are such that the bag when resting in the chamber will rise above the vent, the height being about two-thirds the diameter of the chamber. Cartridge bags are made of the lighter quality silk cartridge-bag material used for field guns, to be closely tied so that the bag will maintain its full diameter.

In using these saluting charges gun detachments should exercise the caution given in section 3 of Paragraph V of G. O. 62, A. G. O., 1902. (See paragraph —, this Manual.)

Invoices and receipts of powder should in all cases give the lot number of powders together with the maker's name.

All projectiles are painted (except band and fuses) with distinctive colors of a thin hard smooth paint, so that their nature may be known at a glance, as follows:

1. The body of all projectiles—black.
2. To distinguish the character of metal the following colors:
 - Forged or wrought steel—blue gray.
 - Cast steel—warm gray.
 - Cast iron—olive green.
 - Chilled iron—light green (Quaker drab).
 - Brass—light yellow.
 - Copper—light reddish brown.
3. To indicate armor-piercing quality:
 - A. P. shot (the whole head including the soft metal cap)—blue gray.
 - A. P. or D. P. shell (one-half the head measured from the point)—blue gray.
 - Chilled iron shot (one-half the head measured from the point)—light green.
 - The rest of the projectiles except as otherwise provided will be painted black.
4. To distinguish the character of bursting charge the following will be used:
 - Charcoal powder—vermillion.
 - Maximite—dark buff.
 - Explosive D—deep yellow.

This color will be applied to the base plug, where there is one, and to the cylindrical portion of the body in the rear of the copper band.

If the projectile be without a base plug, the entire base of the projectile will be painted with the distinctive color of the charge.

Shrapnel will be painted as follows:

Front charge.—Body black, with band of vermillion on head below the fuse.

Base charge.—Body black, with band of vermillion on cylindrical portion of body in rear of copper band.

Canister, black all over.

5. The position of the center of gravity of the larger projectiles will be indicated by a band of paint (of the color corresponding to the metal of the projectile), one-half caliber wide, extending equally one-half above and below the position of the center of gravity. This band may also be employed with the smaller calibers of projectiles, when there is no other indication of the character of the metal.

In case galleries are wet projectiles after painting will be slushed. (Cir. 43, A. G. O., 1902.)

The color to indicate the character of bursting charges will not be applied until the projectiles shall have been filled. (Cir. 43, A. G. O., 1902.)

Paints for use in painting projectiles will be issued in 1 and 5 pound cans in such quantities as may be required from time to time. For detailed instructions as to use, etc., of these paints, see pamphlet *Paints for Projectiles*, issued by the Ordnance Department, U. S. Army.

Steel shells for seacoast guns for all calibers of 4-inch and upward are charged with high explosives and only issued to posts fully charged. Shells will not be charged at posts, and any uncharged shells on hand will be turned in to be replaced by charged shells up to the limit provided for reserve ammunition in G. O. 62, A. G. O., 1902.

The allowance of ammunition and primers for target practice and instruction is fixed annually.

Owing to the difficulties and delays incident to the shipment of explosives the commanding officers of posts and of batteries of field artillery are instructed to make requisition for ammunition for instruction and annual practice of seacoast and field artillery in time to reach the Chief of Ordnance at least three months prior to the time it will be needed for use. (Chapter I, G. O. 75, A. G. O., 1901.)

The allowance of reserve ammunition for each post is as follows:

Ten rounds per gun for 8-inch, 10-inch, and 12-inch B. L. rifles and 12-inch B. L. mortars.

One hundred rounds per gun for 4-inch, 4.72-inch, 5-inch, and 6-inch R. F. guns.

Two hundred rounds per gun for 6 and 15 pounder R. F. guns. (G. O. 99, A. G. O., 1903.)

Requisition for reserve ammunition will be made only at posts where suitable magazines or other storage places are provided. (G. O. 99, A. G. O., 1903.)

Seacoast projectiles will always be piled with points to the wall and base out, so they may be easily inspected and fused in case of action. (Cir. 43, A. G. O., 1902.)

DUMMY PROJECTILES AND CARTRIDGES.

Dummy projectiles and cartridges are issued to the service for drill purposes with seacoast guns. For the guns from 5 inch upward with separate loading the cartridges are made to represent the service charge in size, number of sections, but not in weight. The cartridge bag is made of drab duck and filled with wooden blocks of the same size, and arranged in the same manner as the powder grains of the same sizes.

The projectiles are made of cast iron of the same weight as the service projectile with a metal band at the base to hold them in position. The earlier issues of these

projectiles were provided with a rubber band. All such projectiles on hand should be turned in to be replaced by the late model with metal band.

For use with the 4-inch D. S. and 4.72 and 6 inch Armstrong guns special dummy projectiles and metallic cartridge cases are issued. For 6-pounder and 15-pounder rapid-fire guns special drill cartridges are issued for the respective calibers.

The allowance of dummy projectiles and cartridges for the larger guns and drill cartridges for the smaller calibers is four per gun per post.

There is issued with each dummy cartridge and projectile for the larger seacoast guns one extractor hook.

For the 12-inch B. L. mortars separate dummy cartridges are issued for use with the 12-inch mortar steel as well as for the 12-inch mortar cast iron, steel hooped, on account of the difference in size of powder chambers.

Dummy cartridges and projectiles or drill cartridges are also issued to mountain, field, and siege batteries, one for each gun.

In making requisitions for dummy projectiles and cartridges the kind of gun for which required should always be clearly stated in the requisition.

Price of dummy projectiles and cartridges.

Caliber.	Cartridge.	Projectile.
4-inch R. F. gun	\$5.60	.....
4.72 R. F. (40 caliber)	5.50	} \$14.57
4.72 R. F. (45 and 50 caliber)	6.00	
5-inch R. F. O. D.	1.20	16.41
6-inch R. F. O. D.	1.56	17.63
6-inch R. F. (Armstrong)	7.75	.....
8-inch B. L. rifle	6.54	26.98
10-inch B. L. rifle	9.02	38.85
12-inch B. L. mortar	5.20	41.95

For method of packing ammunition and quantities in package, etc., see "Packing and transportation," page 645.

The shrapnel for field and siege guns is packed for shipment and storage in wooden boxes, each containing a number of complete rounds, shrapnel, primers (including extra ones), bursting charges and fuses (when shrapnel are not shipped fixed) in hermetically sealed lacquered tin cases. All shrapnel, except that for 7-inch mortar, is issued filled, fused, and fixed; that for the latter is issued plugged, the bursting charge and fuse being separate in tin cases.

In handling shrapnel care should be exercised to prevent injury to fuse. Fuses and tin cases are moisture proof; the tin-foil core of the former should not be removed, nor the tin case opened until just before firing.

FUSES.

The standard fuses used for artillery projectiles and manufactured by the Ordnance Department are as follows:

STANDARD FUSES.

Designation.	Weight.	Threads.		Maxi- mum resist- ance to arming.	W R	Projectiles in which the fuses are used.
		Pitch, number per inch.	Outside diameter.			
<i>Base percussion fuses.</i>						
Fuse A, model 1900, high.	Ounces. 8½	12, left hand..	1.122	Pounds. 222	8.22	5 and 6 inch rifle and 7-inch howitzer shell and 8, 10, and 12 inch rifle detonat- ing fuses.
Fuse A, model 1900, low.	8½	12, left hand..	1.122	68	10.62	7-inch and 12-inch mortar shell and 12-inch mortar detonating fuses.
Fuse W, model 1900, low.	17½	12, left hand..	1.50	174	10.622	12-inch mortar shell and torpedo shell detonating fuses.
Fuse C, model 1900, high.	4	14, left hand..	0.874	128	1.92	3-inch, 3.2-inch, and 3.6-inch rifle and 3.6-inch mortar shell, and 5 and 6 inch rifle and 7-inch howitzer detonating fuses.
Fuse C, model 1900, low.	4	14, left hand..	0.874	36	7.77	7-inch mortar detonating fuses.
Fuse for 1-pdr. shell, high, model 1901.	1½	18, left hand..	0.722	.....	.....	1-pounder shell.
<i>Point percussion fuses.</i>						
F. A. fuse, 1.65, model 1900, high.	2½	16, right hand.	0.776	120-133	1.21	1.65-inch Hotchkiss moun- tain gun.
F. A. fuse, N, model 1900, high.	5½	12, right hand.	1.04	96-105	2.83	3, 4, 5, and 6 inch M. L. R. shell.
<i>Point combination fuses.</i>						
F. A. 15 seconds, model 1900, high.	17½	8, right hand..	1.18	190	1.19	3, 3.2, 3.6, 5, and 6 inch rifle shrapnel.
F. A. 28 seconds, model 1900, low.	18½	8, right hand..	1.18	82	7.75	7-inch mortar shrapnel.
F. A. 28 seconds, model 1900, high.	18½	8, right hand..	1.18	75	8.80	3.6-inch mortar and 7-inch howitzer shrapnel.

The component parts of the various standard fuses are as follows:

Frankford Arsenal base percussion fuses.

	Price.
Fuse A, model 1900, high and low:	
a Body	
b Closing cap	
c Primer-closing screw	
d Primer	
e Tin-foil disk	
f Primer shield	
g Firing-pin sleeve	
h Firing pin	
i Split-ring spring	
k Locking groove	
l Brass covering disk	
m Percussion primer composition	
n Magazine powder charge	
w Safety wire	
v Vent	
Total	\$0.72
Fuse W, model 1900, low:	
a Body	
b Closing cap	
c Primer-closing screw	

Frankford Arsenal base percussion fuses—Continued.

	Price.
Fuse W, model 1900, high and low—Continued.	
d Primer.....	
e Tin-foil disk.....	
f Primer shield.....	
g Firing pin sleeve.....	
h Firing pin.....	
j Split-ring spring.....	
k Locking groove.....	
l Brass covering disk.....	
m Percussion primer composition.....	
n Magazine powder charge.....	
w Safety wire.....	
v Vent.....	
Total.....	\$1.32
Fuse C, model 1900, high and low:	
a Body.....	
b Closing cap.....	
c Primer-closing screw.....	
d Primer.....	
e Tin-foil disk.....	
f Primer shield.....	
g Firing-pin sleeve.....	
h Firing pin.....	
j Split-ring spring.....	
k Locking groove.....	
l Brass covering disk.....	
m Percussion composition.....	
v Vent.....	
w Safety wire.....	
Total.....	\$0.43
Fuse for 1-pounder shell:	
a Body.....	
b Closing cap.....	
c Primer.....	
d Primer shield.....	
g Firing-pin sleeve.....	
h Firing pin.....	
j Split-ring spring.....	
k Locking groove.....	
l Brass covering disk.....	
m Percussion composition.....	
Total.....	\$1.32
F. A. fuse 1.65, model 1900:	
a Body.....	
b Closing cap.....	
c Primer closing screw.....	
d Primer.....	
e Tin-foil disk.....	
f Primer shield.....	
g Firing-pin sleeve.....	
h Firing pin.....	
j Split ring spring.....	
k Locking groove.....	
l Brass covering disk.....	
m Percussion composition.....	
v Vent.....	
Total.....	\$0.44
F. A. fuse N, model 1900:	
a Body.....	
b Closing cap.....	
c Primer closing screw.....	
d Primer.....	
e Tin-foil disk.....	
f Primer shield.....	
g Firing-pin sleeve.....	
h Firing pin.....	
j Split ring spring.....	
k Locking groove.....	
l Brass covering disk.....	
m Percussion primer composition.....	
n Magazine powder charge.....	
o Tin-foil disk.....	
p Screw.....	
v Vents (5).....	
Total.....	\$0.62

a Low C, model 1900, \$0.31 each.

Frankford Arsenal time fuses, model 1900.

[High 15-second combination; low 22-second combination; high 28-second combination.]

		Price.	
		15second.	28second.
a	Body.....		
b	Compressed powder ring.....		
b-1	Retaining ring.....		
b-2	Brass ring.....		
b-3	Brass cup.....		
b-4	Felt washer.....		
c	Time train.....		
d	Time-train cone.....		
e	Cone cover.....		
e-1	Drawn brass waterproof cover.....		
e-2	Soldering strip.....		
f	Cap.....		
g	Clamping nut.....		
h	Time plunger.....		
h-1	Split ring spring.....		
i	Safety pin.....		
j	Connecting tube.....		
k	Powder charge.....		
k-1	Powder-chamber closing screw.....		
l	Percussion primer.....		
l-1	Tin-foil disk.....		
l-2	Percussion primer composition.....		
l-3	Brass cup.....		
m	Concussion firing pin.....		
n	Percussion firing-pin sleeve.....		
n-1	Percussion safety wire.....		
o	Percussion firing pin.....		
p	Dowel pins (2).....		
q	Stud pin.....		
r	Concussion primer composition.....		
r-1	Tin-foil disk.....		
s	Vents (4).....		
t	Split ring spring.....		
w	Wrench hole.....		
y	Tin-foil base cover.....		
z	Bottom closing screw.....		
z-1	Base vents (8).....		
z-2	Locking groove.....		
Total, high or low.....		\$1.365	\$1.512

Action of time fuses.—In punching fuse see that pin enters up to shoulder to insure penetration of cone.

If fired for percussion burst, punch at maximum time setting, but do not remove safety pin.

Ignition of time train is due to punched hole acting as vent for gases from primer charge and compressed powder ring.

High-resistance fuses are issued fixed in loaded shell. Low-resistance fuses are provided with safety wires and are transported separately. Remove wire, apply thick lead paint to thread, and screw fuse into shell hard just before firing.

Of the fuses model 1900, enumerated in previous paragraphs, the following are still in service. Their manufacture, however, is discontinued, and those in store will be used when available, or altered to later models as shown in the following table:

Fuses.	Diameter of threads.	Threads per inch.	Resistance to arming.	Projectiles and detonating fuses.	To be altered to—
<i>Base percussion, model 1900.</i>	<i>Inches.</i>	<i>Pounds.</i>	<i>Pounds.</i>		
High-resistance A	1.125	12	222	5 and 6 inch rifle shell, 7-inch howitzer shell, 8, 10, and 12 inch rifle shell detonating fuses.	S, model 1902.
Low-resistance A	1.125	12	68	7-inch mortar shell, 12-inch mortar shell detonating fuse.	S, model 1902.
High-resistance C	0.875	14	136	12-pound mountain-gun shell, 8, 3.2, and 3.6 inch rifle shell; 3.6-inch mortar shell; 5 and 6 inch rifle shell, and 7-inch howitzer shell detonating fuse.	F, model 1902.
Low-resistance C	0.875	14	36	7-inch mortar shell detonating fuse.	F, model 1902.
Low-resistance W	1.5	12	111	12-inch mortar torpedo shell detonating fuse.	12 m, Model 1902.
Special AA	1.105	10	222	Certain 5-inch rifle and 7-inch howitzer shell with fuse hole threaded to receive this fuse.	

The following table exhibits the fuses now standards for use in powder-charged projectiles and in detonating fuses:

Fuses.	Model.	Diameter of threads.	Threads per inch.	Resistance to arming.	Projectiles and detonating fuses.
<i>Point percussion.</i>		<i>Inches.</i>		<i>Pounds.</i>	
High-resistance 1.65-inch.	1900	0.78	16	165	Shell, Hotchkiss mountain gun, caliber 1.65 inches.
High-resistance N	1900	1.04	12	165	3, 4.5, and 6 inch M. L. R.
<i>Point combination.</i>					
High resistance, 15 seconds.	1900	1.18	8	190	3, 3.2, 3.6, 5, and 6 inch rifle shrapnel.
High resistance, 28 seconds.	1900	1.18	8	75	3.6-inch mortar and 7-inch howitzer shrapnel.
Low resistance, 28 seconds.	1900	1.18	8	32	7-inch mortar shell.
<i>Base percussion.</i>					
F	1902	0.875	14	Arming revs. per min. 2,000	3, 3.2, 3.6 inch field guns and 3.6-inch mortar shell charged with black powder. Detonating fuses made with Peirce siege fuse stock.
8	1902	1.125	12	2,000	5-inch siege gun and field howitzer, 5 and 6 inch R. F. guns, and 7-inch howitzer charged with black powder.
7 M	1902	1.125	12	2,000	7-inch mortar shell charged with black powder.
12 M	1902	1.5	12	1,200	12-inch mortar shell charged with black powder. Detonating fuses made with Peirce torpedo fuse stock.
12 M (special)	1902	1.125	12	1,200	Detonating fuses made with Peirce D. P. fuse stock.

NOMENCLATURE, ETC.

POINT PERCUSSION FUSES, F. A.

High-resistance 1.65-inch fuse, model 1900.

Primer closing screw.	Plunger sleeve.
Closing cap screw.	Plunger spindle.
Tin-foil disk.	Body.
Primer.	Safety ring.
Percussion composition.	Base vents.
Primer shield.	Bottom closing disk.

Price of fuse, \$0.44.

High-resistance fuse N, model 1900.

The nomenclature of the parts of this fuse are the same as for the 1.65-inch fuse. A small charge of rifle powder is added in the base of the body to augment the flame from the percussion composition.

The following are the parts of this fuse additional to those of the 1.65:

Screw.	Powder charge.
Tin-foil cup.	

Price of fuse, \$0.52.

POINT COMBINATION FUSES.

15-second high-resistance fuse, model 1900.

Cap.	Closing screw.
Safety pin.	Powder charges.
Time plunger.	Cover dowel pin.
Safety rings.	Cone dowel pins (2).
Cone cover.	Body.
Percussion composition.	Wrench hole.
Clamping nut.	Percussion primer.
Tin-foil disks.	Vents (8).
Time-train cone.	Primer shield.
Time train.	Plunger sleeve.
Retaining ring.	Plunger spindle.
Powder ring.	Bottom closing screw.
Vents (4).	Base vents (5).
Firing pin.	Paper disk.
Brass washer.	Base cover.
Felt gas check.	Head cover.
Gas-check cup.	Soldering strip.
Connecting tube.	

Price of fuse, \$1.365.

28-second fuse, high resistance, model 1900.

Price of fuse, \$1.512.

This fuse is similar in construction to the 15-second fuse. (See above). The head of fuse is longer, to accommodate a longer time-train cone and time train. The cone is graduated by fifths of a second to 28 seconds.

28-second fuse, low resistance, model 1900.

Price of fuse, \$1.512.

This fuse is similar to the 28-second, high-resistance fuse, differing from it in the lower resistance to arming and by the addition of a safety pin, which passes through the lower plunger and sides of body, to prevent accidental arming of fuses. The safety pin must be removed before the fuse can be inserted in projectile.

BASE PERCUSSION FUSES, F. A.

Fuses, F, S, 7 M, 12 M, and 12 M special, model 1902.

These fuses are of the revolving pin centrifugal type, and depend for their arming on the rapid revolution of the plunger. The general features of the design are the same in all respects, with the following nomenclature:

Closing disk.	Firing pin.
Cap.	Firing-pin axis.
Primer.	Rotating pin.
Powder delay train.	Plunger.
Percussion composition.	Spring.
Primer shield.	Pivot pin.
Pawl.	Body.
Pawl axis.	Side-impact wedge.
Stop pin.	

Price of fuse,

The plungers of fuse, 7 M, 12 M, and 12 M special are also provided with a device to cause action of the fuse on side impact of the projectile. The plunger is tapered to the rear, and a side-impact wedge is inserted in the rear end, the conical head of the wedge fitting into a conical recess in the fuse body.

The primer consists of a brass plug, bored to receive the percussion composition, and a powder train. The crookedness of the powder train is designed to secure a delay of two-hundredths of a second. The percussion composition is covered by a thin shield of brass. The primer is screwed into rear end of cap. The cavity in cap is filled with block powder and closed with a disk.

Fuse 12 M special differs from fuse 12 M only in that it is provided with a side impact plunger.

For use in detonating fuses the fuses are modified by the removal of the powder from cavity in cap and by the threading of walls of cavity to receive the threaded end of detonator.

Fuses A, high and low resistance;

Fuses C, high and low resistance; and

Fuse W, low resistance. (For prices see page 345.)

These fuses are of the same general design as the point-percussion fuses. The details of fuse A, high resistance, fuse C, low resistance, and fuse W are shown in Plate (V) (pamphlet on fuses, etc.), the same letters as in Plate (I) (pamphlet on fuses) being used to designate the same parts. The safety pin of the low-resistance fuses is shown in Plate (V).

For instruction purposes there are issued to seacoast fortifications the following sectional fuses and primers:

Fuse A, model 1900, high and low.

Obturator friction primer.

Obturator electric primer.

15-second combination time fuse.

Mounted on a board com- board.	Price of plate \$13.	{	(Allowance 1 board per
			post. For each post or fort garrisoned by more than 3 companies of C.A., 1 additional board per each additional 3 companies or less.)

In connection with these fuses there are issued illustrated plates numbered from 1 to 4, showing the various parts of fuses, etc., to supplement the sectional fuses for instruction purposes.

There are issued to each battery of field and siege artillery for instruction purposes one specimen board, containing the following sectionalized fuses and primers, to wit:

1 base percussion fuse High "C."

1 15-inch combination time fuse.

1 electric obturator primer.

1 friction obturator primer.

Price of board complete \$13.

When shrapnel is assembled at the place of firing with the low-resistance fuse the shrapnel should be handled carefully, as a drop of 3 feet might arm the fuse and then another drop of a few inches might ignite it.

Fuses, when assembled, must be screwed tight home to prevent premature explosion from the inflamed gases in the gun.

Fuses must not be taken out of the hermetically sealed cases nor have the tin-foil protection removed until just before firing.

Fuses must not be dismantled or taken apart for examination or inspection. If an examination of the exterior of the fuses at any time leads to a suspicion that they have been injured in any way, or are in an improper condition, the suspected fuses should be shipped to Frankford Arsenal for examination, or a sample of same can be sent to that arsenal by mail.

There are issued for purposes of instruction in fuse cutting to each battery of field artillery one dummy combination fuse, with five extra cones and covers. One fuse with five extra covers and five extra cones constitute a set (price of set, \$1.86), extra covers and cones being issued from time to time as required, not to exceed 20 cones and 20 covers per annum per battery. (Price of extra cones, 12 cents each; covers, 24 cents each.)

The fuse punch for cutting the time train is the old pattern modified by the addition of the circular brass casting to give support in withdrawing pin and prevent breakage.

There are issued twelve fuse-punch pins with each fuse punch.

There are issued to siege batteries the following fuse tools, one set for each gun, consisting of—

	Price.
1 fuse punch for combination fuse
1 fuse wrench for base-percussion fuse A
1 fuse wrench for base-percussion fuse low C
Also one set of filling and fixing tools—	
Comprising 2 chisels
1 pin wrench
1 wooden block for caliber of projectile used, 5 or 7 inch

WRENCHES FOR FUSES.

The following wrenches for siege and seacoast shot and shell are issued:

	Price.
1 tit wrench for detonating siege fuse
1 tit wrench for Peirce detonating seacoast fuse
1 wrench for Frankford Arsenal base percussion fuse for siege and seacoast shell

The following wrenches for base plugs for siege and seacoast shot and shell are issued:

	Price.
1 tit wrench for base plug for siege shell, steel
1 tit wrench for base plug for A. P. shot
1 tit wrench for base plug A. P. and D. P. shell and torpedo and cast-iron mortar shell

PRIMERS.

The following table shows the standard primers issued for field, siege, and seacoast guns:

No.	Designations.	Cannon in which used.
FRICTION.		
1	Cannon friction primer for axial vent. (Price each, \$0.04.)	3.2-inch B. L. R., 3.6-inch B. L. R., 8-inch M. L. R., and old smooth-bore guns.
2	Cannon friction primer for radial vent. (Price each, \$0.03.)	3.2-inch B. L. R., 3.6-inch B. L. R., 8-inch M. L. R., and old smooth-bore guns.
3	Cannon friction primer (for use with adaptors in subcaliber firing). (Price each, \$0.05.)	1-pounder subcaliber tubes in seacoast cannon having vented breech blocks.
4	Obturator friction primer (with screw thread for old model vents). (Price each, \$0.24.)	3.6-inch B. L. M., 5-inch B. L. R. siege, 7-inch B. L. H., 7-inch B. L. M., 8-inch B. L. R., 10-inch B. L. R., 12-inch B. L. R., and 12-inch B. L. M.
5	Obturator friction primer for siege cannon (model 1902). (Price each, \$0.25.)	5-inch B. L. R. siege, 7-inch B. L. H., and 7-inch B. L. M.
ELECTRIC.		
1	Electric cannon primer for axial and radial vents. (Price each, \$0.06.)	3.2-inch B. L. R., 3.6-inch B. L. R., 8-inch M. L. R., and old smooth-bore guns.
2	Obturator electric primer (single wire and with screw thread for old model vents). (Price each, \$0.24.)	3.6-inch B. L. M., 5-inch B. L. R. siege, 7-inch B. L. H., 7-inch B. L. M., 8-inch B. L. R., 10-inch B. L. R., 12-inch B. L. R., and 12-inch B. L. M.
3	Electric primer for use with adaptor in Armstrong R. F. guns. (Price each, \$0.45.)	4.72-inch and 6-inch Armstrong guns.
COMBINATION ELECTRIC AND FRICTION.		
1	Combination electric and friction primer for seacoast cannon (model 1902). (Price, each, \$0.55.)	5 and 6 inch R. F. guns, 8-inch B. L. R., 10-inch B. L. R., 10-inch B. L. M., 12-inch B. L. R., and 12-inch B. L. M.
PERCUSSION.		
1	Percussion primer for use with adaptor in Armstrong R. F. guns. (Price each, \$0.45.)	4.72-inch and 6-inch Armstrong guns.
2	Short percussion primer for fixed ammunition. Price, 1 pdr., \$0.35; 1.65-inch and 3-inch Hotchkiss and 75 mm. V.-M., \$0.35; 6 and 16-pdr., \$0.35; 3-inch field gun, \$0.35; 4-inch D. S. R. F. gun, \$0.18.	1-pounder subcaliber tubes (percussion firing), 1.65-inch and 3-inch Hotchkiss and 75 mm. Vickers Maxim mountain guns, 6-pounder and 15-pounder D. S. R. F. guns, 3-inch field gun, and 4-inch D. S. R. F. gun.
IGNITING PRIMERS.		
1	Igniting primers for fixed ammunition. (Price each, \$0.06.)	1-pounder subcaliber tubes (electric or friction firing).

All cannon primers are packed in hermetically sealed tin boxes; all small-arms primers in damp-proof tin boxes.

DIRECTIONS FOR PULLING OBTURATING FRICTION PRIMERS.

These primers are adjusted in manufacture to require a pull of about 25 pounds to start the wire to the rear, and about 40 to 45 pounds to pull the teeth through the compressed friction pellet and explode it.

The lanyard should be pulled from a position as near the rear of the gun as possible, since pulling it from the side will cause a variable part of the pull to be absorbed by friction in the firing leaf. A strong, quick pull—not a jerk—from one man, with as short a lanyard as practicable, should be used. When a long lanyard is used, the slack causes the force to be applied to the primer slowly, and this increases the chances for a misfire. The quicker the pull the better for firing the primer, but when a man attempts to pull by a jerk he uses his arms only, losing the assistance of his body, and the strength of his pull will be less. If a primer can not be discharged by one man, it should be rejected and another used. By using more than one man on the lanyard there would be danger of injuring the firing mechanism.

Both the siege and combination obturating primers are so constructed that when a primer is pulled and fails to fire the primer wire is free to move forward without

causing the composition to ignite. As an extra precaution, however, to prevent any attempt to use again a primer that has failed, the primer wire, immediately after ejection, should be bent round the primer through an angle of about 180.

As a general rule the primer should be inserted while the breech is open and during the progress of the other operations of loading.

Constant inspection of the safety pin on the firing leaf of the breech mechanism in which these combination primers are used should be made, since if the safety pin should be broken by harsh treatment and the pull upon the lanyard be upward by about 10, the primer would probably be ejected at the instant of firing and might injure the cannoneer firing the pieces. (Cir. 47, A. G. O., 1902.)

Such articles as loaded shells, fuses, friction primers, water caps, rockets, and fireworks will never be put in a magazine containing powder. (A. R., 397.)

Loaded shells will not be fused until there is occasion for firing them. (A. R., 398.)

The allowance of ammunition for the instruction of the coast and field artillery and for practice with machine guns will be determined each year and announced in general orders from the headquarters of the Army. (A. R., 413.)

The allowance for the year 1903-4 until further orders is fixed by G. O. 99, A. G. O., 1903.

The commanding officer of a post, battery, or company will forward for the information of the Chief of Ordnance, on forms supplied by the Ordnance Department, a report of each shot fired in practice, instruction, and active service. (A. R., 415.)

The 3.2-inch shell weighing $13\frac{1}{2}$ pounds with band 1.35 inches from base will be used only in the radial vent, model 1885, 3.2-inch guns. The 3.2-inch shell weighing $13\frac{1}{2}$ pounds with band $\frac{1}{2}$ inch from the base will be used in the model 1897 3.2-inch guns.

No more 3.2-inch shells weighing $16\frac{1}{2}$ pounds will be issued to the service.

Cartridge-storage cases are issued for use in storing reserve supply of ammunition provided by G. O. 99, A. G. O., 1903, for storage at various seacoast fortifications. Two classes of these cases are issued to the service, the galvanized-iron hermetically sealed case, model 1901, and the zinc storage-case balata washers. The latter cases will be replaced when worn out by the later model galvanized-iron hermetically sealed cases.

The commandants of the Artillery School, at Fort Monroe, Va., and the School of Submarine Defense, at Fort Totten, N. Y., are authorized to expend ammunition at such times and in such quantities as they may deem necessary for the purposes of the schools, provided the ammunition so expended is not in excess of 50 per cent of the amount allowed the respective posts where the schools are located. (G. O. 99, A. G. O., 1903.)

Service charges of the necessary weight to give the initial velocities required by the range tables for the various seacoast guns will be issued by the Ordnance Department, ready for immediate use, except for 12-inch B. L. mortars (for which charges will be issued corresponding to velocities given on page — of this Manual). (G. O. 99, A. G. O., 1903.)

After the expenditure of ammunition in target practice with rapid-fire guns using metallic cartridge cases the empty cases will be taken up on the property returns of post as "empty metallic cartridge cases," under the heading provided for that purpose. Immediately after firing the cases will be decapped, well cleaned by washing inside and out, and dried prior to storage. These cases are to be turned in to Frankford Arsenal to be reloaded. (G. O. 99, A. G. O., 1903.)

The Ordnance Department has devised, and issues for drill purposes to the seacoast artillery, a drill primer for friction firing. This primer, whenever practicable, will be used for saluting purposes, subcaliber firing, and for night and other practice. (G. O., 99, A. G. O., 1903.)

The primer is issued as a part of a drill primer outfit or box. This box for guns, with old model vents, contains:

	Price.
25 cases or bodies.....	\$2.68
38 rear wires.....	1.88
100 serrated wires, with friction pellets (in hermetically sealed can).....	\$1.00
1,500 brass closing cups.....	1.91
1 powder can (empty).....	.25
1 powder charger (24 grains).....	.06
1 funnel.....	.09
1 assembling tool.....	.04
1 disassembling tool.....	.04
1 reamer.....	.60
1 box.....	2.00
Total.....	12.45

The allowance of these primers per annum per company is fixed annually in the general orders for allowance of ammunition, etc., for target practice.

Complete instructions for assembling, disassembling, care of the components, and pulling the drill primer are given in a small pamphlet furnished with each box. A limited number of additional copies will be supplied upon application if required.

These outfits will be replaced later by the new button primer for new model vents.

The primer outfit for the new model vents contains:

	Price.
25 cases or bodies.....	\$3.13
38 button wires.....	1.88
100 serrated wires.....	\$1.00
1,500 brass closing cups.....	1.91
1 powder can.....	.25
1 powder charger (24 grains).....	.06
1 funnel.....	.09
1 assembling tool.....	.04
1 disassembling tool.....	.04
1 reamer.....	.60
1 box.....	2.00
Total.....	12.97

PRIMER LEGEND.

Pull (rear) wire, brass.
 Body, brass.
 Serrated wire, brass.
 Gas check, brass.
 Paper cylinder.
 Friction composition.
 Powder, 24 grains.
 Closing cups.

All obturating electric and friction primer cases should be cleaned immediately after firing and turned in to the post ordnance officer for shipment to Frankford Arsenal, as provided for .30-caliber shells. (G. O. 99, A. G. O., 1903.)

Each battery of field artillery will be allowed such charges and primers as may be necessary for firing authorized salutes. These will be made a separate item of expenditure. (G. O. 99, A. G. O., 1903.)

An addition of 50 per cent to the allowance of ammunition given in the tables will be made for each company of coast artillery and each battery of field artillery which may have been, from any cause, deprived of target practice in the preceding year, but no additional allowance beyond the 50 per cent will be made in case the period during which the battery may have been deprived of target practice shall exceed one year. (G. O. 99, A. G. O., 1903.)

At field artillery stations where, during a portion of the year, weather conditions prevent subcaliber practice with full charges, each battery of field artillery at such

station will be given an additional allowance per annum of gallery practice ammunition with subcaliber tubes, as provided for infantry and cavalry in paragraph XXII of G. O. 99, A. G. O., 1903. (G. O. 68, W. D., 1903.)

Salutes with cannon will be fired under the charge of a commissioned officer, who shall be present at the firing and direct it. (G. O. 99, A. G. O., 1903.)

Guns using metallic case ammunition will be employed whenever practicable in firing salutes; in their absence breech-loading guns should preferably be used. Muzzle loaders will be used only when breechloaders are not available. When using muzzle-loading guns a sufficient number should be employed, if practicable, to avoid the necessity of firing the same gun a second time. (G. O. 99, A. G. O., 1903.)

For breech-loading guns with separate loading, or for muzzle-loading guns, cartridge bags for saluting purposes will be made of raw silk fiber. The cartridges for muzzle-loading guns will be made to measure in length at least one and one-half times the diameter. Care will be taken that the sponges are not worn and that they thoroughly fill the chamber or bore of the gun, and when the same gun is fired more than once the intervals between the discharges will be sufficient to allow the chamber or bore to be thoroughly sponged and examined. Unless all of these conditions be fulfilled, salutes will not be fired with these classes of guns. (G. O. 99, A. G. O., 1903.)

Metallic ammunition saluting charges will be assembled at the posts. For this purpose there are issued saluting cartridge cases, charges of saluting powder in bags, felt wads, primers, adapters, etc. The cartridge cases are issued unprimed, with primers in separate moisture-proof tin boxes, and should not be primed until just before inserting charge and wad. In assembling the case is first properly primed, and the bag containing the saluting charge is then placed in the case and the felt wad inserted and pressed down against the bag to hold it in place against the primer. Care must be taken to insure the cartridge bag being in contact with the bottom of the case when the gun is fired. (G. O. 99, A. G. O., 1903.)

All smokeless-powder charges for mortars will be issued made up ready for use, as the charge varies with each lot of powder. (G. O. 99, A. G. O., 1903.)

BLANK CHARGES.

For instruction, salutes, and for morning and evening gun, the following will be the charges:

Gun.	Charge.
6-pounder (2.24 inch) rapid-fire gun	1½ pounds saluting powder.
2.95 inch Vickers-Maxim mountain gun	1½ pounds saluting powder.
15-pounder (3-inch) rapid-fire gun	2 pounds saluting powder.
3-inch Hotchkiss mountain gun	1½ pounds saluting powder.
3-inch rifle (M. L.)	1 pound mortar or saluting powder.
3.2-inch B. L. rifle	2½ pounds I. K. powder or 1½ pounds saluting powder.
3.6-inch B. L. rifle	2 pounds saluting powder.
6-pounder (3.67-inch), bronze	1 pound mortar or saluting powder.
4-inch rapid-fire gun	4 pounds saluting powder.
4½-inch siege rifle	3½ pounds cannon powder or 2 pounds saluting powder.
Light 12-pounder (4.62-inch), bronze	1½ pounds mortar or saluting powder.
4.72-inch rapid-fire gun, Armstrong	5 pounds saluting powder.
5-inch siege rifle	3 pounds I. K. or saluting powder.
5-inch rapid-fire gun (Ord. Dept.)	5 pounds saluting powder.
6-inch rapid-fire gun, Armstrong	5 pounds saluting powder.
6-inch rapid-fire gun (Ord. Dept.)	5 pounds saluting powder.
7-inch siege howitzer	8 pounds I. K. or saluting powder.
8-inch converted rifle	7 pounds saluting powder.
8-inch smooth-bore gun	7 pounds saluting powder.
10-inch smooth-bore gun	10 pounds saluting powder.
8-inch B. L. rifle	12 pounds saluting powder.*
10-inch B. L. rifle	18 pounds saluting powder.*
12-inch B. L. rifle	30 pounds saluting powder.*
12-inch B. L. mortar	18 pounds saluting powder.*

* Used during maneuvers only.

NOTE.—Smokeless powder will not be used for blank charges.





CHAPTER XI.

MISCELLANEOUS IMPLEMENTS AND EQUIPMENTS FOR SEACOAST FORTIFICATIONS; MACHINES, TOOLS, MANEUVERING MATERIAL, CRUSHER GAUGES, ALLOWANCES OF SUPPLIES FOR SEACOAST POSTS, ETC.

IMPLEMENTS AND EQUIPMENTS FOR SEACOAST GUNS.

The following implements are furnished with each seacoast rifle of Ordnance Department manufacture from 5-inch to 12-inch caliber, to wit:

	Price, each, for—						
	5-inch.	6-inch.		8-inch.		10-inch.	
	B. P. M.	Dis. C.	P. M. t.	Dis. C.	Barb. C.	Dis. C.	Barb. C.
1 rammer and stave.....	\$3.43	\$3.36	.....	\$11.16	\$5.82	\$13.56	\$12.34
1 rammer and stave, short.....	.....	.....	.....	5.12	.....	.....	9.43
1 sponge and stave, bore.....	5.75	7.69	.....	9.00	9.00	12.54	12.54
1 sponge and stave, chamber.....	.....	.....	.....	14.00	14.00	14.12	14.12
1 sponge and rammer prop.....	.....	.....	.....	3.68	.....	5.68	.....
1 breech cover.....	1.64	3.05	.....	4.95	4.95	5.59	4.70
1 combined tompon and muzzle cover.....	2.40	2.50	.....	8.62	.....	8.70	.....
1 sponge cover, bore.....	.32	.34	.....	.55	.....	.62	.....
1 sponge cover, chamber.....	.....	.....	.....	.62	.....	.69	.....
1 slush brush with handles to connect with special sponge staff.....	3.47	3.68	.....	4.00	4.00	4.50	4.50
1 steel scraper and socket to fit special sponge staff.....	2.40	2.13	.....	1.00	1.00	1.06	1.06
1 special sponge staff for slush brush and steel scraper.....	5.33	5.94	.....	5.00	5.00	7.96	7.96

	Price, each, for—					
	12-inch.			6-inch.	Armstrong.	
	Dis. C.	Barb. C.	A. G. L. C.	M. L. Conv. R.	4.72.	6-inch.
1 rammer and stave.....	\$11.33	\$12.00	\$9.69	\$3.52	\$5.68	\$5.36
1 rammer and stave, short.....	12.92	.....	.....	.....	.....	.....
1 sponge and stave, bore.....	13.94	13.94	13.94	10.00	7.86	7.69
1 sponge and stave, chamber.....	14.20	14.20	14.20	.....	.....	.....
1 sponge and rammer prop.....	.....	.....	.....	.....	.....	.....
1 breech cover.....	6.00	5.25	.....	.....	2.00	1.06
1 combined tompon and muzzle cover.....	8.70	.....	.....	3.35	.41	.65
1 sponge cover, bore.....	.70	.....	.....	.35	.....	.....
1 sponge cover, chamber.....	.79	.....	.....	.....	.....	.....
1 slush brush with handles to connect with special sponge staff.....	4.32	4.32	4.32	.....	4.20	6.42
1 steel scraper and socket to fit special sponge staff.....	1.06	1.06	1.06	.....	1.98	2.67
1 special sponge staff for slush brush and steel scraper.....	9.00	9.00	9.00	.....	.....	.....

In requiring for any of this equipment the caliber, model, and number of gun and the kind and model of carriage gun is mounted on should be clearly stated in the requisition.

The following equipment is supplied for each rifle and carriage, 5-inch to 12-inch caliber:

	Price.
2 paint pots, 1 gallon	\$0.30
1 sieve for paints and oils .....	.30
2 brush, wall, 4-inch ^a .....	.40
3 sash tools, No. 6 ^a .....	.13
3 brushes, paint, 60 ^a .....	.64
2 duster, painters, No. 2 ^a .....	.38

^a Expendable.

The following implements are furnished with each 12-inch B. L. mortar, to wit:

	Price.
1 rammer and stave	\$8.26
1 sponge and stave, bore	20.50
1 sponge and stave, chamber	
1 sponge and rammer, prop	4.60
1 breech cover	
1 combined tompon and muzzle cover	8.75
1 sponge cover, bore .....	.56
1 sponge cover, chamber	
1 slush brush with 14-foot handle	4.50
1 steel scraper with 14-foot handle	2.28
1 special bore sponge with stave	9.00

^a For cast-iron mortar S. H. \$4.40.

The following equipment is supplied for each 8 mortars and carriages:

	Price.
2 paint pots, 1 gallon	\$0.30
1 sieve for paints and oils .....	.30
12 brushes, wall, 4-inch ^a .....	.40
12 sash tools, No. 6 ^a .....	.13
12 brushes, paint, 60 ^a .....	.64
6 dusters, painters, No. 2 ^a .....	.38

^a Expendable.

OIL STORAGE TANKS.

Oil storage tanks are issued for use at seacoast posts, in storing cylinder and lubricating oils, in sizes of 60 gallons for cylinder oils and 30 gallons for lubricating and kerosene oil.

The allowance of these tanks per post is as follows:

	60-gallon tank for cylinder oil.	30-gallon tank for lubricating oil.	30-gallon tank for kerosene oil.
For every two 12-inch carriages	1	1	1
For every three 10-inch carriages	1	1	1
For every four 8-inch carriages	1	1	1
Equipment furnished with each tank and considered a part of complete tank:			
Detachable pump	1	1	1
1-gallon measures	2		
1-quart measures		2	2
1-gallon funnels	1		
1-quart funnels			1
1-pint funnels		2	
Price (each tank complete)	\$7.50	\$5.99	\$5.99

The issue of faucets, gallon measures, and funnels as separate items of supply has been discontinued.

Cylinder, lubricating, and kerosene oil is issued in 5-gallon cans of such pattern as to admit of their use as storage cans and the issue of the fresh oil at posts in small quantities. The large storage tanks provided for should be used for storage of old oil after being thoroughly strained and decanted. In taking oil out of gun cylinders it should invariably be strained into the storage tank. Old and new oil should never be mixed. The old oil must be kept separate and carefully examined before being put back into the cylinders.

The use of filters is not deemed advisable in general service, and if after straining, the oil is not in good condition—fairly clear and free from foreign matter—it should be condemned.

Cylinder capacity of service carriages.

Size.	Kind.	Total capacity.
		<i>Gallons.</i>
5-inch	Barbette, model 1896	2
6-inch	Disappearing, model 1896	10
6-inch	Barbette, model 1892	20
8-inch	Disappearing, experimental	28
8-inch	Disappearing, model 1894	20
8-inch	Disappearing, L. F., model 1896	20
10-inch	Experimental disappearing, L. F.	17
10-inch	Disappearing, L. F., model 1894	66
10-inch	Disappearing, model 1893, A. R. F. and L. F.	46
10-inch	Barbette, model 1893	32
12-inch	Barbette, model 1892	84
12-inch	Disappearing, L. F., model 1893 and 1897	41
12-inch	Mortar, model 1891	70
12-inch	Mortar, model 1896	12
		10

Table of annual allowance for each gun and carriage.

MATERIAL FOR CLEANING AND PRESERVATION OF SEACOAST ARMAMENT.

(All expendable.)

Guns and mortars with carriages.	For guns and mortars only, superior graphite paint No. 57.	For carriages only, superior graphitic paint No. 38.	Linseed oil, boiled.	Light slushing oil (for slushing bore, etc.).	For lubricating carriages.	
					Synovial oil.	Lubricant No. 4 (for trunnions only).
	<i>Galls.</i>	<i>Galls.</i>	<i>Galls.</i>	<i>Lbs.</i>	<i>Galls.</i>	<i>Lbs.</i>
2.24-inch R. F. rifle (6-pounder) on parapet carriage.						
3-inch rifle (15-pounder) on balanced pillar mount.	1	2	1	17		
4-inch rifle on pedestal mounting	1	3	1	17		
4.72-inch rifle on pedestal mounting	1	4	1	26	1	
5-inch rifle on pedestal mounting	1	5	1	30	1	
5-inch rifle on barbette carriage, balance pillar mount, model 1896	1	5	1	30	1.5	
6-inch rifle on pedestal mount (Armstrong)	1	5	1	30	1.5	
6-inch rifle on pedestal mount (Ordnance Department)	2	6	1	33	1.5	
6-inch rifle on disappearing carriage, L. F., model 1896	2	6	1	38	1.5	
8-inch rifle on barbette carriage, model 1892	2	8	2	49	1.5	7
8-inch rifle on experimental disappearing carriage, L. F.	2	7	2	46	1.5	
8-inch rifle on disappearing carriage, L. F., model 1894	2	12	3	62	2	8
8-inch rifle on disappearing carriage, L. F., model 1896	2	12	3	62	2	8
10-inch rifle on disappearing carriage, L. F., model 1893	2	12	3	62	2	8
10-inch rifle on experimental disappearing carriage, L. F.	3	7	3	52	2	
10-inch rifle on disappearing carriage, L. F., model 1894	3	11	4	72	3	9
10-inch rifle on disappearing carriage, L. F., model 1896	3	11	4	72	3	9
10-inch rifle on disappearing carriage, L. F., model 1896	3	10	4	72	3	9

Table of annual allowance for each gun and carriage—Continued.

MATERIAL FOR CLEANING AND PRESERVATION OF SEACOAST ARMAMENT—Continued.

Guns and mortars with carriages.	For guns and mortars only, superior graphite paint No. 57.	For carriages only, superior graphite paint No. 33.	Linseed oil, boiled.	Light slushing oil (for slushing bore, etc.).	For lubricating carriages.	
					Synovial oil.	Lubricant No. 44 (for trunnions only).
	Galls.	Galls.	Galls.	Lbs.	Galls.	Lbs.
10-inch rifle on disappearing carriage, A. R. F., model 1896.....	3	12	5	110	3	9
12-inch rifle on barbette carriage, model 1892.....	4	8	4	72	3	.....
12-inch rifle on disappearing carriage, L. F., models 1896 and 1897.....	4	12	6	85	4	10
12-inch mortar on carriages, models 1891 and 1896.....	2	7	3	56	.....	.....
Price.....	\$1.25	\$1.25	\$0.68	\$0.06	\$0.16	\$0.07

Guns and mortars with carriages.	Hydrolene (for cylinders). ^b	Kerosene oil.	Cotton waste.	Burlap.	Packing needles.	Flax twine.
	Gallons.	Gallons.	Pounds.	Yards.	Number.	Pounds.
2.24-inch R. F. rifle (6-pounder) on parapet carriage.....	.....	10	10	5	.....	1
3-inch rifle (15-pounder) on balanced pillar mount.....	1	10	10	10	2	1
4-inch rifle on pedestal mounting.....	.....	10	15	15	3	1
4.72-inch rifle on pedestal mounting.....	10	10	15	20	3	1
5-inch rifle on pedestal mounting.....	5	10	15	20	3	1
5-inch rifle on barbette carriage, balance pillar mount, model 1893.....	5	10	15	20	3	1
6-inch rifle on pedestal mount (Armstrong).....	5	10	20	20	3	1
6-inch rifle on pedestal mount (Ordnance Department).....	5	10	20	20	3	1
6-inch rifle on disappearing carriage, L. F., model 1895.....	10	10	20	20	4	1
8-inch rifle on barbette carriage, model 1892.....	20	10	20	30	4	2
8-inch rifle on experimental disappearing carriage, L. F.....	30	10	25	30	4	2
8-inch rifle on disappearing carriage, L. F., model 1894.....	20	10	25	30	4	2
8-inch rifle on disappearing carriage, L. F., model 1896.....	20	10	25	30	4	2
10-inch rifle on barbette carriage, model 1893.....	35	10	25	35	4	2
10-inch rifle on experimental disappearing carriage, L. F.....	55	10	30	35	4	2
10-inch rifle on disappearing carriage, L. F., model 1894.....	45	10	30	35	4	2
10-inch rifle on disappearing carriage, L. F., model 1896.....	35	10	30	35	4	2
10-inch rifle on disappearing carriage, A. R. F., model 1896.....	35	20	40	35	4	2
12-inch rifle on barbette carriage, model 1892.....	45	10	30	50	4	2
12-inch rifle on disappearing carriage, L. F., models 1896 and 1897.....	70	20	40	50	4	2
12-inch mortar on carriages, models 1891 and 1896.....	15	10	20	35	4	2
Price.....	\$0.80	\$0.12	“ \$0.04	\$0.055	\$0.07	\$0.20

^a White. .065 per pound.^b The allowance of hydrolene oil is what is estimated to refill cylinders once per annum, if necessary, and the full allowance is not to be drawn except when needed. Requisitions should state the quantity on hand and if all cylinders are filled.

Vaseline is no longer issued. Light slushing will be issued in its stead for all guns where the former has been issued in tool or armament chest.

Sperm oil is no longer issued to seacoast posts, light slushing oil being issued in its stead, the allowance of the latter as fixed in the supply table being estimated to be sufficient for all purposes.

In making requisition for material for cleaning and preservation, the number of guns and carriages of each caliber mounted at post must be given, or the requisition will be returned for this information, causing unnecessary delay.

Requisitions for "Garlock's" packing should give the model of carriage for which same is required.

Requisitions for these supplies should be made annually, on January 1 and July 1.

All paints are issued ready for use.

For full instructions for painting seacoast guns, mortars, carriages, etc., see General Orders, No. 200, Adjutant-General's Office, 1899.

The removal of name and direction plates when painting field, siege, and seacoast gun carriages has frequently resulted in their being assembled to the wrong carriage when replaced, which interferes with the keeping of a proper record of each carriage.

The trunnion brackets for telescopic sights for seacoast gun carriages have also frequently been removed from the trunnions of the guns when painting, requiring a new adjustment of such brackets to bring the line of collimation of the sight parallel to the axis of the bore of the gun when reassembled.

The removal of the above parts is unnecessary for the purpose of painting guns and carriages, and this practice is forbidden. (Circular 36, A. G. O., 1903.)

GARLOCK'S WATERPROOF HYDRAULIC PACKING FOR STUFFING BOXES.

(Expendable.)

Guns and mortars.	One set per carriage per post, annual allowances.			Price.	
	Rings.	Section.	Inside diameter.	Per ring.	Per set.
		<i>Inches square.</i>	<i>Inches.</i>		
3-inch rifle (15-pdr.), on balanced pillar mounting...	2	0.375	1.25	.....	.....
5-inch rifle, on pedestal mounting	2	.5	1.5	.....	.....
5-inch rifle, on barbette carriage, model 1895, on balanced pillar mounting	6	.625	2.25	.....	.....
6-inch rifle, on disappearing carriage, L. F., model 1898.	2	.875	3.75	.....	.....
8-inch rifle, on barbette carriage, model 1892	20	.625	2.5	.....	.....
8-inch rifle, on experimental disappearing carriage, L. F.	10	1	3.25	.....	.....
8-inch rifle, on disappearing carriage, L. F., model 1894.	22	.75	3.5	.....	.....
8-inch rifle, on disappearing carriage, L. F., model 1896.	22	.75	3.5	.....	.....
10-inch rifle, on barbette carriage, model 1898	18	.75	3	.....	.....
10-inch rifle, on experimental disappearing carriage, L. F.	10	.875	4	.....	.....
10-inch rifle, on disappearing carriage, L. F., model 1894.	16	.75	4	.....	.....
10-inch rifle, on disappearing carriage, L. F., model 1896.	24	.75	4	.....	.....
10-inch rifle, on disappearing carriage, A. R. F., model 1896.	22	.75	3.5	.....	.....
12-inch rifle, on barbette carriage, model 1892.	22	.75	3.5	.....	.....
12-inch rifle, on disappearing carriage, L. F., models 1896 and 1897	14	1	4	.....	.....
12-inch mortar carriage, models 1891 and 1896.	24	.875	4.75	.....	.....
	22	.625	3.5	.....	.....

The issue of petrolatum and resin, for slushing the bores of guns, protecting bright surfaces, etc., has been abolished and light slushing oil is issued instead in the quantities given on pages 359-360. This oil may be applied direct from the can by the use of sash tools (No. 6) issued for that purpose. In cold weather it should be previously warmed.

Hydrolene oil must be used by itself and not mixed with old neutral oil in any manner. Cylinders should be thoroughly cleansed before filling with hydrolene oil, to remove all foreign matter. (Circular No. 6, A. G. O., 1901.)

The allowance of oils for lubricating and preservation purposes as fixed in table of supplies, pages 359-360, is estimated to be sufficient for all purposes, including the trolley lines and lifts in the magazines.

Corn brooms are supplied by the Ordnance Department as required only for policing

the interior of the magazines and other constructions at the batteries. (The allowance is 1 per gun per month for guns 5 to 12 inches caliber except mortars, for the latter 3 per pit of 4 mortars per month; for guns of less than 5-inch caliber 1 for each 2 guns per month, expendable.) Requisitions for brooms should state for what purpose they are required, otherwise they can not be considered until this information is furnished. Price, \$0.29.

The allowance of Putz pomade, tripoli, and many other small articles of a similar character has not been definitely fixed, owing to the divers conditions at different posts and the impossibility of attempting to fix a definite allowance of all these many small items.

Requisition for these materials should be made from time to time as required, the allowance depending on the reasonable needs of the service as shown by past expenditures at the post for which required.

POWDER SAMPLES FOR INSTRUCTION.

There are furnished for instruction purposes to each seacoast fortification and each post garrisoned by seacoast artillery samples of smokeless powder in properly labeled glass bottles as follows:

	Price each.
1 bottle of 15-pounder smokeless powder.....
1 bottle of 5-inch E. F. gun smokeless powder.....
1 bottle of 10-inch B. L. rifle smokeless powder.....
1 bottle of 12-inch mortar smokeless powder.....

These sample bottles of powder will be taken up on the property returns of post and accounted for as provided by regulations for ordnance property.

Rubber hose are supplied as required by the Ordnance Department for use in policing the interior of the magazines, and for use in cleaning seacoast guns and carriages.

MANEUVERING MATERIAL.

Maneuvering material for use in mounting and dismounting modern seacoast guns and carriages, and mechanical maneuvers with the old patterns of guns and carriages, are supplied by the Ordnance Department, one set to each post.

A set of maneuvering material is composed of the following:

	Price.
Yellow pine, saw finish:	
10 timbers, 10 by 10 inches by 35 feet, each, \$3.921.....	\$39.21
20 timbers, 10 by 10 inches by 25 feet, each, \$5.42.....	128.40
10 timbers, 8 by 8 inches by 15 feet, each, \$2.57.....	25.70
20 planks, 12 by 2 inches by 30 feet, each, \$1.97.....	39.40
150 blocks, 12 by 12 inches by 44 inches, each, \$1.56.....	237.00
100 blocks, 12 by 6 inches by 44 inches, each, \$0.84.....	84.00
50 blocks, 12 by 4 inches by 44 inches, each, \$0.56.....	28.00
20 blocks, 12 by 2 inches by 44 inches, each, \$0.281.....	5.62
10 blocks, 10 by 2 inches by 18 inches, oak, each, \$0.236.....	2.36
20 rollers, 3 feet in length, 8 inches in diameter, each, \$2.50.....	50.00
2 15-ton hydraulic jacks, each, \$68.....	136.00
2 30-ton hydraulic jacks, each, \$180.18.....	360.36
1,800 feet rope, 5-inch, manila, \$0.0875 per foot.....	157.50
400 feet rope, 7-inch, manila, \$0.105 per foot.....	42.00
1,000 feet rope, 4-inch, manila, \$0.0525 per foot.....	52.50
1,000 feet rope, 3-inch, manila, \$0.0315 per foot.....	31.50
1 garrison pin, with double and triple sheave blocks.....	274.80
2 double blocks for 5-inch rope, each, \$21.50.....	43.00
2 treble blocks for 5-inch rope, each, \$30.00.....	60.00
2 double blocks for 4-inch rope, each, \$13.60.....	27.20
2 treble blocks for 4-inch rope, each, \$21.88.....	43.76
3 single snatch blocks for 5-inch rope, each, \$15.50.....	46.50
1 capstan complete, with anchor stakes.....	82.68
12 maneuvering handspikes, each, \$1.56.....	18.72
2 crowbars, 5 feet long, each, \$1.25.....	2.50
2 pinch bars, 5 feet long, each, \$1.40.....	2.80

	Price.
2 pipe wrenches, large, each, \$3.....	\$6.00
2 pinch bars, 7 feet long, each, \$1.87.....	3.14
4 mauls, metal heads, with wood faces, each, \$6.80.....	17.60
2 sledge hammers, 16 pounds, each, \$1.60.....	3.20
1 marline spike.....	1.40
2 hammers, 4 pounds, smiths', each, \$0.67.....	1.34
2 hammers, carpenters', each, \$0.42.....	.84
1 crosscut saw, large, for timber.....	2.50
1 hand saw.....	1.27
1 hand ax.....	1.75
1 hatchet.....	.75
1 mallet.....	.25
1 cold chisel.....	.56
1 straightedge.....	2.50
1 steel tapeline, 50 feet.....	4.50
1 plumb bob.....	1.00
1 carpenter's spirit level.....	1.50
1 steel square.....	1.50
1 two-foot rule.....	.50
2 dog chains, each, \$16.25.....	32.50
50 feet wire rope, 1 inch diameter, each, \$0.21.....	10.50
1 oil can, squirt, 1 quart.....	1.75
10 gallons kerosene oil, for cleaning, each, \$0.12.....	1.20
2 gallons sperm oil, each, \$0.61.....	1.22
10 pounds spun yarn, each, \$0.08.....	.80
50 pounds cotton waste, each, \$0.0225.....	1.13
10 quires emery paper, each, \$0.55.....	5.50
1 quire sandpaper.....	.12
50 pounds 50-penny spikes, each, \$0.028.....	1.40
50 pounds 20-penny spikes, each, \$0.028.....	1.40
2 counterweight hooks, steel, $\frac{1}{2}$ inch, each, \$0.72.....	1.44
For gun cradle:	
2 pine timbers, 10 by 10 inches by 25 feet, each, \$6.51.....	13.02
4 pine blocks, 10 by 10 by 24 inches, each, \$0.625.....	2.49
8 pine blocks, 6 by 12 by 44 inches, each, \$0.69.....	2.07
1 pine block, 12 by 12 by 44 inches.....	1.56
Decking of 12 by 6 by 44 inch blocks (11), each, \$0.69.....	7.59
Chocks of pine cut to fit, driven and spiked in place (10), each, \$0.15.....	1.50
8 $\frac{1}{2}$ -inch bolts, 4 feet, thread and nut at each end, each, \$1.25.....	10.00
2 1 by 22 inch bolts, thread and nut at each end, each, \$0.44.....	.88
6 1 by 14 inch bolts, thread and nut at each end, each, \$0.38.....	2.28

* Expendable.

There are issued with each set of maneuvering material 3 dollies.

These dollies have 14-inch beds, with iron rollers, and are utilized for shifting heavy timbers about the post in the work of mounting or maneuvering large seacoast guns and carriages. Price each, \$3.33.

Variations in foregoing list will be made when specially required, but the necessity must be clearly stated.

Material for mechanical maneuvers will be issued as required to renew such as may have been expended, condemned, or destroyed. In the latter instance the requisition should be accompanied by the inspection report, as provided by regulations.

Mechanical maneuvers will not be practiced with the new ordnance material, but will be confined to the old patterns of guns and carriages. (A. R., 387.)

Carpenters' tools, other than provided for in the set of maneuvering materials, are not furnished by the Ordnance Department for post.

Yale-Weston triplex pulley blocks of large tonnage are not issued as part of the permanent maneuvering equipment for posts, but such blocks will be loaned to posts requiring them to mount modern guns, upon completion of such work to be returned to arsenal from which they were issued.

SEACOAST-ARTILLERY TARGETS.

Artillery floating and towing targets are supplied to the service, the allowance per post varying somewhat according to the nature of the harbors and opportunities for target practice with full service conditions. Generally, however, a supply of three floating targets and two towing targets for each post with modern guns of various calibers is considered ample, and the necessity for an excess should be fully set forth in the requisition for same.

Component parts of floating target.

No. of pieces.	Names of parts.	Finished dimensions of each piece.			Contents (superficial feet).		Remarks.	Price.
		Length.	Width.	Thick-ness.	Each piece.	Total.		
2	Logs	Feet. 13	Inches. 10	Inches. Round.			10 inches diameter at small end. Spruce.	
4	Uprights	12	8	2	6	24	Spruce	
2	Crosspieces	10½	6	2	10½	20½	do	
1	Ridge block	1	7	7	4½	4½	Whitewood	
4	Pins (for ridge blocks)	¾	1½	Round.			Oak	
4	Key pins (for ridge blocks)	¾	1½	Round.			do	
1	{Rope (manilla) or Chain	{ 150 160	{ a 1½ ¾	{ Round. Round.		b 100	For 100-pound anchor.	
3	Nails (for crosspieces)	¾	¾	Round.			For 150-pound anchor.	
3	Nails (for uprights)	¾	¾	Round.			From ½-inch iron bar.	
1	Cover					200	From ½-inch iron bar.	
1	Anchor					b 150	Cotton cloth.	\$8.20
							Iron, painted, or galvanized.	8.66
	Total							62.56

a Diameter.

b Pounds.

NOTE.—A new combination floating and towing target is to be issued to the service; list of component parts of same will be furnished when finally adopted. Price of target \$125.70.

Component parts of towing target.

No. of pieces.	Name of parts.	Finished dimensions of each piece.			Contents (superficial feet).		Remarks.	Price.
		Length.	Width.	Thick-ness.	Each piece.	Total.		
2	Logs	Feet. 15	Inches. 10	Inches. Round.			10 inches diameter at small end. Spruce.	
4	Uprights	12	8	2	6	24	Spruce	
2	Crosspieces	10½	6	2	10½	31	do	
1	Ridge block	1	7	7	4½	4½	Whitewood	
4	Pins (for ridge blocks)	¾	1½	Round.			Oak	
4	Key pins (for ridge blocks)	¾	1½	Round.			do	
1	{Rope (manilla) or Chain	{ 150 160	{ a 1½ ¾	{ Round. Round.		b 100	For 100-pound anchor.	
1	Barrel	20	a 1½	Round.		b 14	For 150-pound anchor.	
12	Nails (for crosspieces)	¾	¾	Round.			50 gallons.	
8	Nails (for uprights)	¾	¾	Round.			Manila.	
1	Cover					200	From ½-inch iron bar.	
1	Anchor					b 150	From ½-inch iron bar.	
							Cotton cloth.	\$8.20
							Galvanized or painted iron.	8.66
	Total							50.64

a Diameter.

b Pounds.

Parts of these targets or materials for same will be supplied for repairs as required. Pent houses, paulins, and other forms of shelter for seacoast artillery will not be provided. (Circular No. 8, A. G. O., 1901.)

There are issued for use at seacoast fortifications towing lines (rope) for use with towing targets. This rope is 4½-inch rope; 2,000 feet is issued for short-range and 3,000 feet for long-range targets.

MACHINES AND TOOLS FOR SEACOAST FORTIFICATIONS.

For the purpose of repair shops fitted with proper machines, tools, power, etc., for making extended or major repairs of guns, carriages, etc., the seacoast fortifications have been divided into four general districts, the "Central Atlantic," "North Atlantic," "South Atlantic and Gulf," and "Pacific District."

In each of these districts there will be established at the posts named below a machine shop equipped with a full set of machines and tools as given on pages —.

LIST OF POSTS EQUIPPED WITH POWER MACHINE SHOP.

Central Atlantic District.

Fort Du Pont, Del.
Fort Washington, Md.
Fort Armistead, Md.
Fort Slocum, N. Y.

North Atlantic District.

Fort Adams, R. I.
Fort Trumbull, Conn., or H. G. Wright,
N. Y.
Fort Preble, Me.
Fort Constitution, N. H.
Fort Warren, Mass.

South Atlantic and Gulf District.

Sullivan's Island, S. C.
Key West, Fla.
Fort Pickens, Fla.
Fort Morgan, Ala.
Fort St. Philip, La.
Fort San Jacinto, Tex.

Pacific District.

Presidio, San Francisco, Cal.
Fort Flagler, Wash.
Fort Stevens, Oregon.

The equipment of a fully equipped post power machine shop supplied by the Ordnance Department is as follows:

	Price.
1 engine lathe, 21-inch swing, 10-foot centers	\$725.00
1 portable drill, 0 to 1 inch holes, incl. transmission	100.00
1 ceiling motor, 1 horsepower, with reversing speed-regulating rheostat, speed 225 to 150 revolutions per minute	200.00
1 pillar shaper, 10-inch stroke, with direct connected motor	500.00
1 file bench	7.00
1 bench vise, parallel 5-inch jaws	12.00
1 Empire forge, portable	25.00
1 anvil, 150 pounds	9.50
1 grindstone, complete	13.80
1 shaft straightener, portable, 4 inches and less	85.00
1 tool chest	55.00
1 tool and clothes closet	15.00
1 Weston differential hoist, 2 tons, with runaway and trolley	100.00
1 iron rack	5.00
1 pipe threading and cutting machine, 1 to 4 inch pipe	100.00
1 smith's tongs, each, \$0.75	2.20
3 forge bucket .....	.90
1 smith's apron, leather, each, \$0.70	1.40
2 babbitt ladle	1.80
1 galvanized extra heavy pail .....	.50
1 lathe chuck, 12-inch	20.00
1 lathe chuck, 6-inch	14.00
1 ratchet drill	16.00
1 drilling post	8.00
1 set of 17 assorted files and rasps with handles	10.55
2 machinists and engineers' extra heavy screw wrenches, each, \$1.70	3.40
1 set of 7 hammers assorted	5.75
2 hard-wood mallets, each, \$1.05	2.10
1 sledge	1.40
1 hacksaw with two blades .....	.50
1 set of 10 assorted chisels	4.50
1 set of 12 hammer and file handles .....	.75
3 lathe dogs, each, \$0.90	2.70
1 oil can, 1 gallon .....	.40
1 surface plate	10.00
In tool chest:	
2 drill chucks, each, \$4.25	8.50
1 set of 10 flat drills for ratchet drill	4.50
1 set of 10 Morse spiral drills	12.50
1 square, steel, 12-inch graduated	6.00
1 set of 10 reamers	20.00
4 drill sockets, each, \$2.124	8.50
1 set of 10 machinist's hand taps	11.60
1 set of 10 solid bolt dies	16.00
2 adjustable tap wrenches for taps and reamers, each, \$2.25	4.50
10 threading tools, each, \$0.46	4.60
3 hand scrapers, each, \$0.41	1.20
1 scratch awl .....	.45
1 oilstone .....	.55
2 brass oilers, each, \$0.20 .....	.40
1 spirit level, 18-inch brass bound	2.05

	Price.
In tool chest—Continued.	
1 plumb bob.....	\$0.80
1 steel tape, 50-foot (Chesterman).....	1.80
1 square, steel, 24-inch graduated.....	1.00
1 micrometer caliper.....	6.50
1 vernier caliper, 24-inch.....	24.00
1 pair of 20-inch calipers, outside and inside.....	5.00
1 pair of 10-inch calipers, outside and inside.....	2.00
1 pair of 8-inch calipers, outside and inside.....	.25
1 Stubbs wire gauge.....	2.75
1 screw pitch gauge.....	1.60
1 rule, pocket, 24-inch.....	.80
1 spring divide, 6-inch.....	1.75
2 screw-drivers, each \$0.20.....	.40

Each seacoast fortification equipped with modern armament and not supplied with an equipped machine shop, as provided heretofore, will be supplied for the purpose of making small and ordinary repairs with the following set of tools for mechanics and use of electrician sergeants in engineer power plant.

	Price.
1 anvil, 150 pounds (Peter Wright or equal).....	\$12.50
1 ax and 2 handles (Underhill).....	.92
1 blow torch (Wellington).....	3.90
1 brush, bench, all bristles (No. 5)s.....	.51
2 callipers, 6-inch each, one inside and one outside, firm joint (Stevens's best or equal), \$1.20 each.....	2.40
12 chisels, cold, 2 $\frac{1}{2}$ -inch, flat; 2 $\frac{1}{2}$ -inch, flat; 2 $\frac{1}{2}$ -inch, cape; 2 $\frac{1}{2}$ -inch, cape; 2 $\frac{1}{2}$ -inch, cape; 1 $\frac{1}{2}$ -inch, round nose (the foregoing to be of $\frac{1}{2}$ -inch octagon steel); 1 diamond point of $\frac{1}{2}$ -inch octagon steel (all of Howe Browne steel), 30 cents each.....	3.60
1 clamp, wire splicing, copper-faced, 10-inch, 4 holes.....	1.25
2 clamps, 6-inch, drop forged.....	
1 clamp eccentric "Buffalo grip".....	
2 cutters, pipe, $\frac{1}{2}$ inch to 1 inch, \$1.75; 1, $\frac{1}{2}$ inch to 2 inches, \$2.50 (Barnes three-wheel).....	4.25
1 cutter, washer, $\frac{1}{2}$ inch to 6 inches.....	
1 drill, breast, with chuck (No. 12, Fairbanks Co.'s catalogue).....	6.00
12 drills for breast drill—2 $\frac{1}{2}$ -inch, 2 $\frac{1}{2}$ -inch, 2 $\frac{1}{2}$ -inch, 2 $\frac{1}{2}$ -inch, 2 $\frac{1}{2}$ -inch, 2 $\frac{1}{2}$ -inch, straight shank, each \$0.59.....	7.08
1 drill, ratchet, No. 8, with Morse taper round socket, and sleeve to take square-shank drills; also with Nos. 1 and 2 sleeves, both to have external diameter to fit No. 3 taper.....	6.00
6 drills for above with Morse taper shanks, $\frac{1}{2}$ inch to 1 inch by eighths, each, \$0.69.....	4.14
1 set dies and taps, taper, plug and bottoming, $\frac{1}{2}$ inch to 1 inch by sixteenths, with stocks and wrenches, round adjustable dies—U. S. Standard thread (Little Giant or equal).....	
2 pairs dividers—1 6-inch Yankee spring with spring nut.....	.60
1 12-inch lock joint.....	
2 drills, brick—1 $\frac{1}{2}$ -inch, 1 1-inch, 18 inches long (Jewop's steel).....	
1 set dies and taps, pipe, $\frac{1}{2}$ inch to 1 inch, with stocks and wrenches (Armstrong).....	
1 file card.....	.15
1 forge, portable (No. 0 Buffalo).....	12.00
12 files, assorted, with handles (Nicholson), 81 $\frac{1}{2}$ cents each.....	8.75
24 file handles, medium.....	.10
1 gauge, wire, electrician's (Browne & Sharpe).....	1.45
2 hammers, machinist's, ball peen, $\frac{1}{2}$ pound, \$1.10, and 1 $\frac{1}{2}$ pounds, \$1.25 (Sawyer Tool Co. or Billings & Spencer).....	2.35
1 hammer, sledge, tool steel, 10 pounds, with handle.....	1.80
1 hammer, hand, blacksmith's, 1 $\frac{1}{2}$ pounds, oil-finish tool steel, with handle.....	.90
1 hammer, copper, 2 pounds, with handle.....	.70
1 hacksaw frame, adjustable, No. 10 (Star).....	.72
12 hacksaw blades, 10-inch, 20 teeth to inch (Star), each, \$0.052.....	.62
1 level, machinist's, with plumb, 18 inches, No. 6187 (Manning, Maxwell & Moore's catalogue).....	.88
1 oilstone, India, 1 $\frac{1}{2}$ inches by 2 inches by 3 inches.....	.60
2 pairs cutting pliers, 1 6-inch and 1 8-inch, parallel jaws, \$1.29 each.....	2.58
1 pail, galvanized-iron, 14 quarts, extra heavy.....	.33
1 punch, center, machinist's, 4 inches long, $\frac{1}{2}$ -inch wire, knurled handle (Sawyer Tool Co.).....	.10
1 scale, steel, 12-inch, in 32, 64, 50, 100 (Browne & Sharpe).....	
2 screw-drivers—1 6-inch, 30 cents, and 1 12-inch (Champion) 38 cents.....	.68
1 soldering iron, 1 pound.....	8.00
1 speed indicator, 5,000 revolutions (Starrett's).....	2.20
1 tape, steel, 100 feet (Chesterman or equal).....	4.50
8 wrenches, monkey—1 6-inch, 35 cents; 1 12-inch, 53 cents; 1 18-inch, \$1.13 (Coe's).....	2.01
8 wrenches, Stillson—1 6-inch, 63 cents; 1 14-inch, 96 cents; 1 18-inch, \$1.27.....	2.85
1 vise, machinist's bench, adjustable, combination, pipe, with 5-inch jaws, swivel base (Pren-tiss).....	11.00
1 vise, hand, 8-inch, wood handle.....	

* Expendable.

NOTE.—This list should be followed in requisitions for posts not yet supplied with tools for engineer power plant.

The repairs to be made with this set of tools are such as a battery mechanic could advantageously make.

Any parts of equipment requiring repairs that can not be made with these tools should be sent to the machine shop in the district most convenient to the post requiring the repairs.

Whenever the armament of the seacoast fortifications, or part thereof, are in need of the services of skilled mechanics of the Ordnance Department the ordnance officers of forts are authorized, with the approval of their post commanders, to communicate directly with the officers of the Ordnance Department designated below, who have been instructed to comply with requests to furnish the necessary mechanics and materials. For this purpose applications will be made as follows, viz:

For the fortifications of the New England coast down to and including New London, Conn., to the armament officer, Northern Armament district, Watertown Arsenal, Watertown, Mass.

For the fortifications of New York Harbor (excepting those on Sandy Hook), Delaware River, Baltimore, Washington, and Hampton Roads to the armament officer, Central Armament district, Army Building, New York City, N. Y.

For the fortifications on Sandy Hook to the armament officer, Sandy Hook Armament district, Sandy Hook Proving Ground, Sandy Hook, N. J.

For the fortifications of the South Atlantic and Gulf coasts from Wilmington, N. C., to Galveston, Tex., both inclusive, to the armament officer, Southern Armament district, Augusta Arsenal, Augusta, Ga.

For the fortifications of the Pacific Coast to the armament officer, Western Armament district, Benicia Arsenal, Benicia, Cal. (G. O's, 29 and 64, A. G. O., 1903; A. R. 384.)

An acting ordnance officer will be assigned to the staff of each artillery district commander. Such officers will also serve as acting ordnance officers of the posts at which stationed.

The acting ordnance officer of an artillery district will, under the direction of the district commander, have general supervision of all requisitions for ordnance stores from the various posts in the district, which will hereafter be transmitted through the artillery district commander.

Such action on requisitions as is practicable will be taken at artillery district headquarters by the issue or transfer of available stores from one post to another on the order of the district commander, and the requisitions, with note of action taken and recommendations, will be then transmitted to department headquarters. Transfer of guns, carriages, and range finders or other material permanently emplaced will not be made by the artillery district commanders.

In case of issues of stores from one post to another on the order of the district commander regular invoices and receipts will be exchanged as now required. When stores are transferred from one post to another for temporary use the acting ordnance officer at the post in whose charge stores are placed will give a memorandum receipt to the proper officer for such stores, and will be held responsible on such receipt for the property while in his possession.

All communications and returns relating to ordnance material will hereafter be sent through the artillery district headquarters, and the commanding officer thereof will cause such records of ordnance property at the various posts to be kept at district headquarters as may be necessary to carry out the requirements of this order. (G. O., 40, A. G. O., 1903.)

All engine supplies, such as waste, lubricating oils, oil lamps, brooms, brushes, etc., necessary for the operation of the ordnance machine shop, and all materials needed for the use of the battery mechanics in connection with the use of machine tools furnished by the Ordnance Department, will be supplied by the Ordnance Department in such quantities as may be required from time to time.

Portable arm racks are not supplied for troops at posts.

Breech covers are supplied as required for the following seacoast guns:

	Price each.
4.72-inch B. L. (R. F.) rifle (Armstrong).....	\$2.00
6-inch B. L. (R. F.) rifle (Armstrong).....	1.05
5-inch B. L. (R. F.) rifle, Ordnance Department, on barbette carriage, balance pillar mounting.....	1.64
6-inch B. L. (R. F.) rifle, Ordnance Department, on disappearing carriage.....	3.05
8-inch pneumatic dynamite gun.....	72.72
8-inch B. L. rifle, model 1888, on disappearing carriage.....	4.95
8-inch B. L. rifle, model 1888, on barbette carriage.....	4.95
10-inch B. L. rifle, model 1888, on disappearing carriage.....	5.59
10-inch B. L. rifle, model 1888, on barbette carriage.....	4.70
12-inch mortar, steel.....	4.40
12-inch mortar, cast iron, steel hooped.....	4.80
12-inch B. L. rifle, model 1888, on barbette carriage.....	5.25
12-inch B. L. rifle, model 1888, on disappearing carriage.....	6.00
12-inch B. L. rifle, model 1896, on disappearing carriage.....	6.00

Combined tompion and muzzle covers (metal) are supplied as required for the following guns:

	Price each.
4.72-inch B. L. rifle (R. F.), Armstrong.....	\$0.41
5-inch B. L. rifle (R. F.), Ordnance Department.....	2.40
6-inch B. L. rifle (R. F.), Armstrong.....	.65
6-inch B. L. rifle (R. F.), Ordnance Department (disappearing carriage).....	2.50
8-inch M. L. rifle, converted.....	3.35
8-inch B. L. rifle.....	8.62
10-inch B. L. rifle.....	8.70
12-inch B. L. rifle.....	8.70
12-inch mortar, cast iron, steel hooped.....	8.75
12-inch mortar, steel.....	8.75

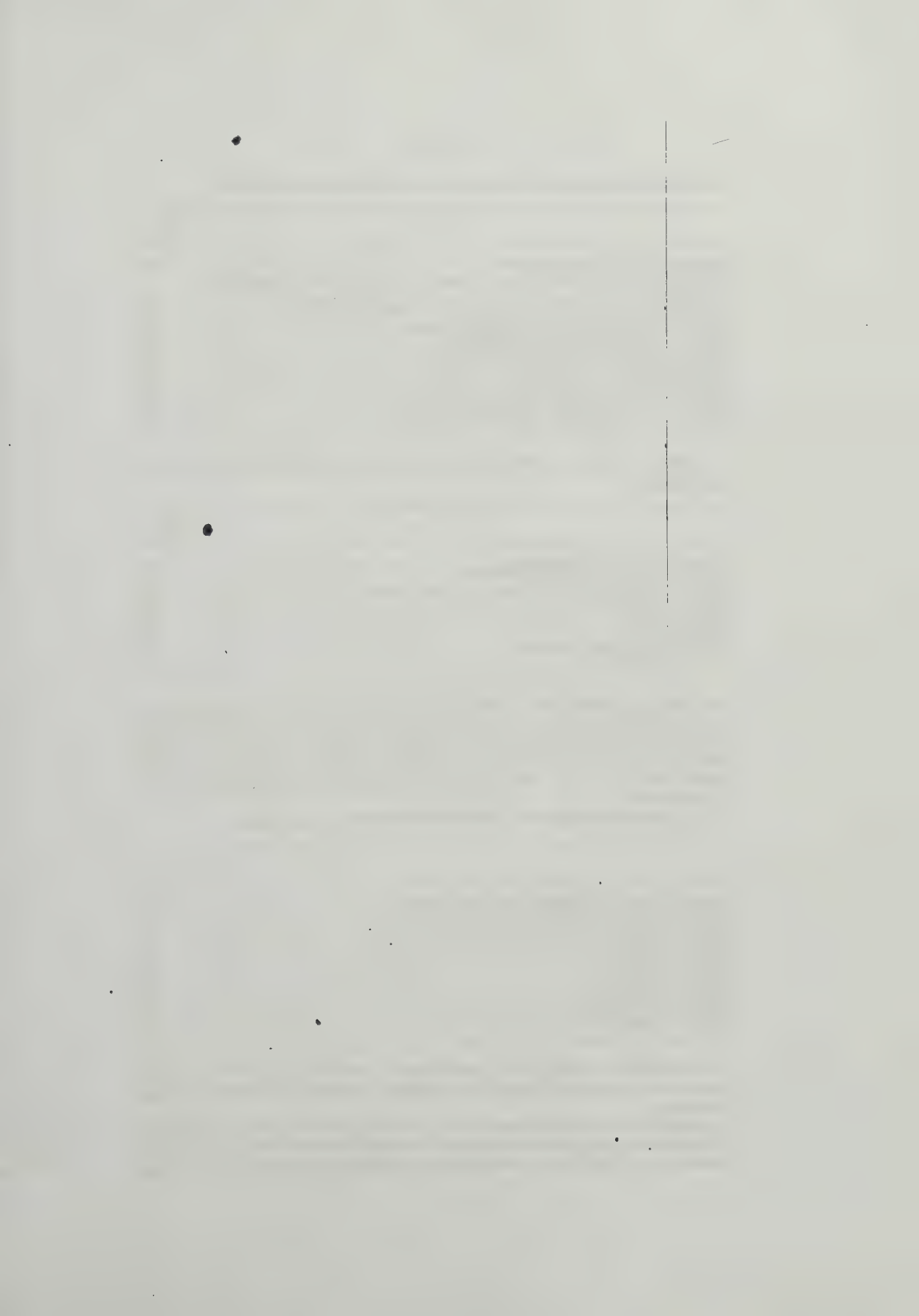
In making requisition for combined tompion and muzzle covers and breech covers for seacoast guns of the larger caliber, the caliber and model of gun, together with the kind of carriage on which the gun is mounted, should be given in the requisition. For the mortars it should be stated whether or not the covers are required for steel or cast iron mortars. Failure to give this information will necessitate return of the requisition.

Sponge covers are supplied as required for the following seacoast guns:

	Price each.
5-inch B. L. rifle (R. F.), Ordnance Department, chamber.....	\$0.32
5-inch B. L. rifle (R. F.), Ordnance Department, bore.....	.32
6-inch B. L. rifle (R. F.), Ordnance Department, chamber.....	.84
6-inch B. L. rifle (R. F.), Ordnance Department, bore.....	.84
8-inch B. L. rifle, bore.....	.65
8-inch B. L. rifle, chamber.....	.62
8-inch converted rifle.....	.35
10-inch B. L. rifle, bore.....	.62
10-inch B. L. rifle, chamber.....	.69
12-inch B. L. rifle, bore.....	.70
12-inch B. L. rifle, chamber.....	.79
12-inch B. L. mortar.....	.56

Requisitions for sponge covers should clearly state the gun for which required and whether for chamber or bore, thus avoiding the return of requisition for this information.

Although paulins or penthouses are not issued for use with modern seacoast guns and carriages, a few paulins for guns and carriages have been issued on account of extraordinary climatic and other conditions existing at the ports to which issued.





The cost of these paulins for gun and carriage is as follows:

For 15-pounder rapid-fire gun and mount	\$13. 10
For 4.72-inch rapid-fire gun and mount (Armstrong)	21. 00
For 6-inch rapid-fire gun and mount (Armstrong)	21. 00
For 5-inch rapid-fire gun and pedestal mount	23. 10
For 8-inch breech-loading rifle and disappearing carriage	48. 00
For 10-inch breech-loading rifle and barbette carriage	67. 33
For 10-inch breech-loading rifle and disappearing carriage	67. 33
For 12-inch breech-loading rifle and barbette carriage	69. 00
For 12-inch breech-loading rifle and disappearing carriage	89. 18
For 12-inch breech-loading mortar (steel) and carriage	24. 03
For 12-inch breech-loading mortar (cast iron) and carriage	34. 85

Magazine slippers for use in magazines are issued as required to post ordnance officers in the following sizes: 7, 8, 9, 10, and 11. Price per pair, \$0.75. These slippers are not expendable and when worn out must be submitted to an inspector, as provided by regulations.

Marking and stencil outfits for seacoast posts are the same as those issued for infantry. (See p. 637.) Allowance, one outfit per post; parts to be renewed as required.

Padlocks are issued to post ordnance officers only for arm racks and armament or tool and implement chests. Requisitions for padlocks must state for what purpose they are required. Failure to do so will require return of requisition.

Tompions, model 1900, are supplied as required for the following guns:

	Price each.
8-inch B. L. rifle, model 1888	
10-inch B. L. rifle, model 1895	\$8. 70
12-inch B. L. rifle, model 1888	8. 70
12-inch B. L. rifle, model 1895	8. 70
12-inch B. L. mortar, steel	8. 75

Requisition for tompions should state for what gun they are required.

Gunners' badges are supplied by the Ordnance Department for seacoast artillery as required, as follows:

	Price each.
Gunners, first-class	\$0. 75
Gunners, second-class .....	. 75
Gunnery specialists .....	. 45

(G. O., No. 94, A. G. O., 1903.)

Gunners' and gunnery specialists' badges issued by the Ordnance Department shall be permanently retained by the soldier.

The company and company number of the soldier will be stamped on the reverse of the badge.

In case of loss a duplicate will be issued. If the loss is the result of carelessness the money value of the badge will be charged against the soldier to whom it was issued on the muster and pay rolls of the organization with which he is mustered.

Officers who issue gunners' or gunnery specialists' badges will enter them on the proper abstract with suitable notation and drop them from their returns. (G. O., 94, A. G. O., 1903.)

HYDRAULIC JACKS.

The regulation jack issued to the service is the Dudgeon hydraulic jack. These jacks are of two patterns, the base and horizontal, and are issued in 3 sizes, 15, 20, and 30 tons.

The component parts of the horizontal jack are as follows:

	Price.				Price.		
	15-ton.	20-ton.	30-ton.		15-ton.	20-ton.	30-ton.
Cylinder				Lowering valve			\$0.95
Cap				Lowering-valve nut			
Socket				Lowering-valve bonnet			
Knuckle				Reservoir			
Piston				Ram packing	\$0.45		.60
Pump nut				Ram packing ring			
Piston valve	\$0.10			Ram packing ring nut			
Piston packing .....	.04			Bottom packing .....	.45		.60
Piston-packing ring				Bottom-packing ring			
Piston-valve bonnet				Pump small nut			
Pump				Ram			
Pump valve .....	.10			Total	74.67	\$100.00	123.25
Pump-valve spring .....	.02						
Pump-valve bonnet .....	.15						

The component parts of the base jack are the following:

	Price.				Price.		
	15-ton.	20-ton.	30-ton.		15-ton.	20-ton.	30-ton.
Base				Packing			
Head				Pump valve			
Ram				Pump plug			
Piston				Ram packing			
Cylinder				Packing rings			
Pump				Valve spring			
Piston valve .....	.10			Pump bonnet			
Piston packing				Socket arm			
Piston-packing ring				Knuckle			
Piston bonnet				Total	74.67	\$100.00	123.25
Pin							

Care should be exercised in the ordering of these parts. The nomenclature given in these lists should be followed. For further description and instructions see pamphlet "Instructions for Using and Repairing Dudgeons Hydraulic Jacks," issued by Ordnance Department.

CRUSHER GAUGES.

Two kinds of crusher gauges are issued to the service, fixed and internal (loose). The former is made in two sizes and the latter in three.

The component parts of the fixed crusher gauge (large) are as follows:

- The housing,
- Closing screw cap,
- Piston,
- Cylinder holder,
- Copper washer,
- Cup gas check,
- Pressure cylinder,
- Blank plug (to be used when pressures are not taken).

The tools issued with each crusher gauge are the following:

- Hexagonal wrench (bronze),
- Hexagonal wrench (steel),
- Gas-check inserting tool,
- Hand pliers.

The fixed crusher gauge (small) has similar parts and tools to those of the large gauge, except there is no closing screw cap and no steel hexagonal wrench.

INTERNAL CRUSHER GAUGE (LOOSE) FOR GUNS OF THREE-INCH CALIBER AND LARGER.

The component parts of this internal crusher gauge are as follows:

Housing,
Closing screw cap,
Piston,
Washer,
Cylinder holder,
Cup gas check,
Pressure cylinder.

The following tools are issued with each of these crusher gauges:

Hexagonal wrench,
Screw driver,
Gas-check inserting tool,
Pliers.

The internal crusher gauge (small) for guns under 3-inch caliber has parts and tools similar to those of the gauge for the larger calibers, except that cylinder holders and pliers are not furnished.

This gauge has been recently designed for use in fixed ammunition in guns less than 3-inch caliber. The area of the piston is one-thirtieth instead of one-tenth square inch, and the pressure cylinder 0.20 inch diameter instead of the cannon pressure cylinder 0.25 inch diameter.

COPPER-COVERED CRUSHER GAUGE FOR CANNON.

This is an internal or loose gauge generally adopted to replace the internal crusher gauge (small) especially for use in cannon in which the propelling charge is not loaded in a metallic case. The gauge is constructed without sharp corners and with a copper cover to prevent injury to the mushroom head and chamber of the gun.

The parts are similar to the internal gauge (small). The tools are as follows:

1 gas check inserting tool,
2 pin wrenches,
2 reamers,
1 hand pliers.

One of the pin wrenches is provided with a recess in the stem for the reamers which are intended for use in reaming out the piston and wrench holes respectively in case of any flowing of the copper due to pressure or to deformation of the copper covering from the gauge striking the mushroom head and side of chamber of gun.

The allowance of crusher gauges complete is 2 per post (1 each, fixed and internal).

List of crusher gauges, tools, and accessories for cannon.

	Price.
Fixed crusher gauge for cannon, large	\$10.00
Blank plugs for fixed crusher gauge, cannon, large a	8.00
Fixed crusher gauge for cannon, small	8.50
Blank plugs for fixed crusher gauge, cannon, small a	1.50
Copper-covered crusher gauge	10.00
Internal crusher gauge for cannon, small:	
For guns under 3-inch caliber	5.00
For guns 3-inch caliber and larger	4.75
Cylinder holders, steel .....	.75
Cylinder holders, rubber, per M	20.00
Gas-check cups:	
For $\frac{1}{4}$ -inch piston, per M	5.00
For $\frac{3}{4}$ -inch piston, per M	1.00

a To protect seat of gauge when latter is not used.

List of crusher gauges, tools, and accessories for cannon—Continued.

	Price.
Copper washers, large, per M.....	\$20.00
Copper washers, small, per M.....	15.00
Pressure cylinders for cannon, 0.25-inch diameter, per M.....	20.00
Pressure cylinders for small arms, 0.2-inch diameter, per M.....	15.00
Hexagonal wrench, bronze, large.....	.50
Hexagonal wrench, bronze, small.....	.40
Hexagonal wrench, steel.....	.25
T wrench for copper-covered gauge.....	.50
Reamer for piston hole.....	.75
Reamer for wrench hole.....	.75
Spanner-pin wrench, steel.....	.75
Spanner-pin wrench, bronze.....	.35
Screw-driver wrench, steel.....	.40
Small flat-nose pliers.....	.25
Gas-check inserting tool.....	.27
Micrometer caliper.....	3.50
Box to contain gauge, tools, etc.....	1.60
Gauges for verifying dimensions of crusher gauges (four in set), per set.....	25.00

With each crusher gauge, accessories, and tools there are issued 10 copper washers, 3 cylinder holders (steel), 100 cup gas checks, and 100 pressure cylinders, and a micrometer for measuring the length of pressure cylinders.

For further description and instructions for use of crusher gauges see pamphlet "Crusher Gauges, Tools, Accessories, etc.," published by Ordnance Department.

MANEUVERING MACHINES AND TOOLS.**CAPSTAN.**

Capstans are issued one per post as part of set of tools, implements, etc., for mechanical maneuvers, etc. (see p. 362). The component parts of same are as follows:

	Price.
Wood parts:	
2 side pieces, oak, 7 feet 3 inches by 7 inches by 4 inches.....	
1 centerpiece, oak, 2 feet by 12 by 4 inches.....	
2 end pieces, oak, 2 feet by 5 by 4 inches.....	
2 side uprights, oak, 2 feet 6 inches by 10.5 by 8 inches.....	
1 top piece, oak, 3 feet by 12 by 3.25 inches.....	
1 capstan drum, oak, 3 feet 4 inches by 17 inches, round.....	
2 side braces, oak, 8 feet 6 inches by 3.5 by 3 inches.....	
Iron parts:	
4 frame bolts, 0.625 inch diameter, 3 inches long.....	
4 upright bolts, 0.625 inch diameter, 34 inches long.....	
2 box bolts, 0.625 inch diameter, 4.75 inches long.....	
2 clamp bolts, 0.625 inch diameter, 26 inches long.....	
1 cast-iron box, 12 by 6.5 by 2.25 inches.....	
1 clamp, 26 by 3.5 by 0.375 inches.....	
1 key, 2.5 inches by 0.75 by 0.25 inch.....	
1 chain, No. 9, iron, 6 inches long.....	
1 eye screw, 2 inches long by 0.5 inch diameter.....	
2 bands, inside diameter, 16 inches; outside diameter, 16.75 inches; width, 2 inches.....	
1 band, inside diameter, 13 inches; outside diameter, 13.75 inches; width, 2.5 inches.....	
1 band, inside diameter, 12.25 inches; outside diameter, 13 inches; width, 2 inches.....	
1 piece of iron for rivets, 126 inches long, 0.375 inch diameter.....	
2 eyebolts, 6 inches long, 0.75 inch diameter.....	
2 rings for eyebolts, inside diameter, 5 inches; 0.75-inch round iron.....	
14 square nuts, 0.625 inch.....	
15 washers, 0.625 inch.....	
1 double bar for capstans, 8.625 inches square in center for a length of 18 inches; round, and tapered to ends; length, 16 feet 10 inches; weight, 45 pounds.....	
2 single bars for capstans, 3.625 inches square at end for a length of 8 inches; round, and tapered to other end; length, 3 feet; weight, 26.5 pounds.....	
12 anchor stakes, oak, 36 by 2.5 by 3 inches; weight, — pounds.....	
300 feet 6.5-inch hemp or manila rope.....	
3 pulley blocks, iron (same as used with garrison gin), with two, three, and four sheaves, and weighing 72, 95, and 120 pounds, respectively.....	
Total cost of capstan.....	\$82.63

CARTS.

Hand carts, hand-sling carts, and large sling carts are issued to posts as required, the allowance being one of each per post. The component parts of the various carts are as follows:

Hand cart.

[Bill of timber.]

Name of parts.	Number of pieces.	Dimensions of each piece, rough.			Contents.		Kind of wood.	Price.
		Length.	Width.	Thickness.	Each piece.	Total.		
Body:		<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Sup. feet.</i>	<i>Sup. feet.</i>		
Axle body	1	40	4.25	3.25	3.83	3.83	Oak	.....
Lower side rails	2	83	3	2.75	4.75	9.51	do	.....
Rear cross rail	1	42	3	2.75	2.41	2.41	do	.....
Front cross rail	1	36	3	2.75	2.06	2.06	do	.....
Middle crossbars	2	36	3	2	1.50	3.00	do	.....
Middle crossbar or handle	1	44	2.25	2.25	1.55	1.55	do	.....
Upper side rail	2	53	2	1.75	1.28	2.57	do	.....
Upper end rail	2	38	2	1.75	.92	1.85	do	.....
Studs, sides and ends	14	16	2	1.25	.28	3.89	do	.....
Side boards	2	55	12	1	4.58	9.17	Ash	.....
End boards	2	35	12	1	2.92	5.83	do	.....
Bottom boards	3	42	11	1	3.21	9.62	do	.....
Two wheels:								
Naves	2	9	8	Round.	3.14	6.28	Oak	.....
Fellies	12	23	5	2	1.60	19.20	do	.....
Spokes	24	22	2	1.5	1.44	11.04	do	.....
Total price of cart								\$28.25

Iron parts.

Parts.	Number of pieces.	Width.	Thickness.	Length.	Weight.
		<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Pounds.</i>
Axletree	1	1.25	1.25	40	17.60
Washers, shoulder and linch	4	.5	1.5	24	1.68
Linchpins	2	1	1.5	4	.16
Linchpin springs	2	.75	.25	4	.21
Linchpin rivets	2	.375	Round.	3	.042
Under straps for axle	2	1.5	.25	24	2.52
Bolts for axle	4	.75	Round.	14	1.71
Do	1	.5	Round.	6	.327
Straps for handle	2	1	.125	30	1.05
Rivets for handle	4	.25	Round.	5	.108
Rivets, body	2	.375	Round.	5	.153
Legs	2	1.25	.25	95	.840
Bolts for legs	4	.5	Round.	16	.872
Corner irons, body	2	1	.125	24	.84
Do	2	1.25	.25	23	2.45
Corner iron plate	1	3	No. 13.	32	1.77
Rivets for plate	6	.375	Round.	12	3.68
Total					35.912
Two wheels:					
Tires	2	1.25	.375	262	32.97
Bolts for tires	12	.25	Round.	36	.469
Nave bands, end	4	.375	.125	54	.83
Nails for nave bands	12	.1875	Round.	12	1.05
Nuts, No. 1	20	.75	.375	.75	1.040
Nuts, No. 2	1	1	.5	1	.15
Washers, No. 1	12	1.25	.125	Round.	1.09
Total					36.574
Nave boxes (cast brass)	2				5

Whole length of body and handles	inches..	74.75
Length of axletree	do.	45.5
Height of wheels	do.	36.5
Distance between the wheels on the ground	do.	36.35
Weight of one wheel	pounds..	84
Weight of body	do.	113
Weight of cart complete	do.	181

Price of cart, \$——.

Hand-sling cart (iron).

Parts.	Number of parts.	Width.	Thick-ness.	Length.	Weight.	Remarks.	Price.
		<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Pounds.</i>		
Iron parts:							
Axletree, arms, and centerpiece.....		8.5	8.5	84	288.12		
Pole, upper strap, and under strap.....		8.5	1	72	70.56		
Bolts, No. 3 D, and No. 8 A and B.....		Round.	1	22	4.78		
Axle hook.....		2.25	1.25	17	14.88		
Pole rivets, No. 3 B.....	3	.5	Round.	12	.654		
Pole strap and eye.....	1	3	.625	24	12.60		
Pole rivets, No. 3.....	6	.875	Round.	24	.736		
Pole handle.....	1	1	Round.	40	8.70		
Pole handle key.....	1	1.25	.25	3	.21		
Pole braces.....	2	.875	Round.	96	16		
Nuts, No. 8.....	4	1.25	.625	1.25	.40		
Shoulder and linch washers (2 each).....	4	1	.5	36	5.04		
Linchpins.....	2	1.5	.75	6	1.80		
Tires.....	2	4	.5	446	250.36		
Tire bolts, No. 2 C.....	18	.5	Round.	108	5.88		
Tire-bolt nuts, No. 2.....	18	1	.6	1	1.76	Hexagon	
Nave bolts, No. 3.....	18	1	Round.	80	17.40		
Nave-bolt nuts, No. 3.....	18	1.25	.625	1.25	8.25	Hexagon	
Washers, No. 2.....	18	1.625	.125	36	2.04		
Nuts, No. 4 (braces and hooks).....	8	1.5	.75	1.5	.90		
Naves (cast iron).....	2						
Wood parts: ^a							
Pole.....	1	4.5	4	120		Oak	59.67
Two wheels:							
Spokes.....	86	3.25	2.5	36		do	
Fellies.....	18	5.75	4.5	27		do	
Total cost of hand-sling cart.							\$97.71

^a Dimensions of the pieces are in the rough.^b Complete.*Sling cart (large).*

Parts.	Number of parts.	Width.	Thick-ness.	Length.	Weight.	Remarks.	Price.
		<i>Inches.</i>	<i>Inches.</i>	<i>Feet.</i>	<i>Pounds.</i>		
Wood parts:							
Axletree.....	1						
Bolster.....	1						
Pole.....	1						15.90
Round.....	2						
Pole prop.....	1						
Wheels (two):							
Naves.....	2						125.00
Spokes.....	82						
Fellies.....	16						
Dowels.....	16						
Iron parts:							
Pole-prop chain, No. 1.....	1	0.15	Round.	3.75	0.26		
Rings, No. 1.....		.2	Round.	.31	.03		
Rivets, No. 2.....		.25	Round.	.50	.08		
Cascable chain.....	1	.4575	Round.	12.20	5.22		
Rivets, No. 3.....		.875	Round.	8	1.10		
Pole rivets.....		.5	Round.	.50	.32		
Bolts, No. 4.....		.75	Round.	4.42	6.50		
Eye pin, No. 1.....	1	.875	Round.	.14	.28		
Bolts, Nos. 2 and 5, and rings.....	1	1	Round.	9.91	26.86		
Pole, staple.....		1.25	Round.	3.17	12.95		
Boltheads, No. 4, and eye pin.....		1.5	Round.	1	5.86		
Screw handle.....	1	1.75	Round.	5.33	42.69		
Boltheads, No. 5.....	2		Round.	.50	5.23		
Nails, No. 3.....		.875	0.875	12.04	5.66		
Toggle for pole-prop chain.....		.5	.25	.10	.06		
Axle washers, upper sketes, nuts (No. 2), and chain hook.....	1		.5	11.25	18.90		

^a Pole prop.^b Complete.

Sling cart (large)—Continued.

Parts.	Number of parts.	Width.	Thick-ness.	Length.	Weight.	Remarks.	Price.
Iron parts—Continued.		<i>Inches.</i>	<i>Inches.</i>	<i>Feet.</i>	<i>Pounds.</i>		
Burrs for pole rivets.....		1.125	0.25	0.15	0.17		
Nuts, No. 8.....		1.25	.625	.10	.26		
Boister hooks.....		1.25	1.25	2.33	12.23		
Axle bands.....		1.3	.2	2.50	2.17		
Nuts, No. 4.....		1.5	.75	3.25	12.23		
Hook for sling chain.....		1.3	1	1.33	6.70	Hammered	
Axle hooks.....		1.5	1.5	2.50	13.90		
Pole prop, ferrule.....		1.75	.375	.66	1.45		
Linchpins.....		1.75	.625	.63	3.04		
Washers, No. 3.....		2	1.125	.33	.27		
Bands for hounds and pole.....		2	.25	10	16.30		
Brow bands for naves.....		2	.375	16.33	41		
Lower skein and stirrups (in part).....		2	.5	10	33.60		
Bridles.....	2	2	.625	1.53	6.63		
Stirrups and pole straps.....	2	2	.75	4.33	24.34		
Nuts, No. 5.....		2	1	.66	4.43		
Upper skeins.....	2	2.25	1.5	.66	2.49		
Nuts, No. 7.....		2.25	1.25	.37	3.49		
Washers, No. 4.....		2.5	.188	4.68	7.19		
End bands for naves.....		2.5	.375	13.32	43.52		
Lower axle-skein body.....	1	3	.5	3.41	17.13		
Hoisting screw (in one piece).....	1	3	3	3.33	115.81	Hammered	
Washers, No. 5.....		3.25	.188	.54	1.10		
Pole-prop socket.....		3.5	.625	1.25	9.13		
Socket of screw handle.....		3.5	2.25	1	25.88	Hammered	
Washers, No. 7.....		4	.25	.66	2.21		
Washers for axle and boister hooks.....		4.5	.375	2.33	13.13		
Two wheel tires.....	2	4.5	.375	50	561	In four pieces.	
Lower axle-skein, middle part.....	1	6	.5	1	10.06		
Pole plate.....		3					
		3.5	.375	3	35.25		
Total.....					1,262.85		
Bedplate for screw.....	1				42	Cast iron	
Nave boxes for two wheels.....	2				61	do.	
Nuts for holding screw.....					14	Cast brass	
Total cost of sling cart, large.....							\$378.80

Weights, etc.

	Large sling cart.	Hand sling cart.
Length from rear of wheel to front end of pole.....inches..	242.4	180.75
Length of axletree.....do.....	92	75.50
Height of wheels.....do.....	96	72
Distance between the wheels on the ground.....do.....	62.75	60.4
Weight of—		
One wheel.....pounds..	714	440
Body.....do.....	700	240
Screw.....do.....	98	
Handles.....do.....	77	
Cart complete, without sling chains.....do.....	2,802	1,115
Trunnion chains and rings.....do.....	61	
Sling chain.....do.....	53	27
	84	

GINS.

Garrison and piper gins are issued to the service upon requisition, one of each to each seacoast fortification or post.

The component parts of the gins are as follows:

Garrison gin.

Number of pieces.	Name of parts.	Dimension of each piece.			Total length.	Total weight.	Kind of iron or wood.	Price.
		Length.	Width.	Thick-ness.				
		Inches.	Inches.	Inches.	Inches.	Pounds.		
3	Iron parts:	19	6	0.25	4.75	24.07		
	Upper bands for legs and pry pole.							
	3 pieces	19.5	4	.2	4.875	13.18		
12	Middle bands for legs and pry pole, 3 pieces.	21	4	.2	5.25	14.18		
		22.5	4	.2	5.625	15.19		
		25	4	.2	6.25	16.88		
3	Lower bands for legs and pry pole.	21.75	4	.25	5.437	18.87		
2	Windlass bands.	32	4	.375	5.33	27.02		
2	Ratchets.	8.25	8.25	1.25	1.375	47.91		
2	Ratchet keys.	1.25	.5	.5	.208	.175		
2	Windlass journals.	16	8	Round.	2.66	63.68		
2	Journal pins.	10.25	.75	Round.	1.708	2.63		
2	Journal collars.	11	1	.75	1.83	4.62		
1	Upper brace.	77	1.5	Round.	6.416	36		
1	Lower brace.	107	1.5	Round.	8.916	52.8		
5	Eyes for braces.	4	8	1.5	1.66	25.82		
4	Brace bolts, 4 pieces.	12.5	1	Round.	4.166	11		
4	Brace-bolt washers.	6	1	.625	2	4.22		
2	Pawls.	3.5	3.25	1	1.666	12.79		
2	Pawl bolts, 2 pieces.	7	2	1.25	1.666	9.83		
2	Pawl-bolt nuts.	9.5	1.25	Round.	1.583	6.65		
2	Pawl-bolt washers.	6.5	1	.625	1.083	2.28		
1	Clevis, 1 piece.	2	1.5	.75	.83	1.26		
1	2 pieces.	3.5	3.25	.75	.583	4.8		
1	Clevis-bolt pin.	23	1.5	Round.	1.916	11.84		
1	Leg and pry-pole points.	4.5	4	1.5	.75	16.20		
1	Collars for points.	26.25	1.75	Round.	2.187	17.75		
2	Handspike sockets.	6.625	.75	Round.	.468	.68		
2	Handspike-socket pawls.	11	2	Round.	2.75	29.18		
2	Handspike-socket screws.	5	5	1	1.25	21.11		
6	Handspike-socket springs.	2.25	1.25	1	.875	1.68		
2	Journal boxes.	1	.5	Round.	.5	.33		
2	Journal-box bolts, 2 pieces.	14	.063	Round.	2.33			
2	Journal-box bolt washers.	10.25	.75	Round.	1.708	2.54		
2	Journal-box bolt keys.	5.25	1	.625	.875	1.84		
2	Journal-box bolt chain rings.	3.5	3.25	.18	.583	1.19		
2	Journal-box bolt keys.	2	1.5	0.75	0.33	1.26		
4	Brace-bolt key chains.	3	1.125	.125	1	.47		
4	Brace-bolt key chains.	14	.15	Round.	4.66	.78		
8	Brace-bolt key chain rings.	6	.18	Round.	4	.87		
2	Clevis-bolt keys.	4	1.5	.125	.66	.42		
2	Clevis-bolt key chains.	40	.15	Round.	6.66	1.12		
4	Clevis-bolt chain rings.	6	.18	Round.	2	.18		
6	Eye pins.	1.5	.375	Round.	.75	1.62		
1	Pry-pole handle.	16.25	1	Round.	1.354	8.68		
2	Pry-pole handle washers.	3.5	3.25	.18	.583	1.19		
24	Screws for washers.	1.5	.22	Round.		1.12		
22	Pry-pole-step nails (11 pieces).	8	.375	Round.	7.83	2.73		
72	Band nails.	6.5	.375	Round.	5.968	2.22		
1	Double hook for block.	2.25	.25	Round.	18.5	2.24		
1	Single hook for block.	6	4	1.75	.66	15.77		
1	Triple-block crossheads.	8	2	1.75	.66	7.88		
2	Double-block crossheads.	6.75	4	1.25	1.125	19		
2	Crosshead nuts.	5.25	4	1.25	.875	14.77		
4	Cheeks for blocks.	2	1.5	.75	1.35	5.06		
3	Partitions for blocks.	16.125	8	.375	5.041	51.10		
4	Eyes for blocks (2 pieces).	11.5	8	.25	2.875	19.42		
2	Sheaves journal (1 piece).	4	2.75	1	.66	6.2		
2	(2 pieces).	9.25	1.125	Round.	.77	2.68		
5	Sheave journal nuts.	7.25	1.125	Round.	.604	2.02		
5	Sheaves.	5	1	.625	.83	2.19		
2	Wood parts:	2	1.5	.75	.33	1.26		
2	Legs.	246	12	9.50				
1	Pry pole.	246	9	9				
1	Windlass.	87	10.50	10.50				
9	Cleats.	9.50	3	2				

There is furnished with each garrison gin complete, the following:

- 1 single block.
- 1 double block.
- 1 triple block.
- 1 fall (120 feet manila or hemp rope). Price, \$4.52.

Price of garrison gin complete, with blocks and fall, \$74.30.

Piper gin (component parts).

NOTE.—The list of these parts will be furnished later.

Price of piper gin complete, \$200.37.

STORE TRUCKS.

Small store trucks used for moving stores about ordnance storehouses, etc., are issued one to each post. The truck is composed of the following principal parts:

Wood parts:	Price.
2 rails, rounded at ends for handles.....	
4 crossbars.....	
2 bolsters.....	
Iron parts:	
1 shoe, fastened to upper side of rails.....	
4 bolts, No. 1 C.....	
4 washers.....	
4 nuts.....	
1 axletree.....	
2 bolts, No. 1 C.....	
2 nuts.....	
2 guard plates.....	
2 wheels.....	
2 shoulder washers.....	
2 linch washers.....	
2 screws.....	
2 props.....	
4 bolts, No. 1 B.....	
4 nuts.....	
Weights and dimensions:	
Whole length of body and handles.....inches..	66.5
Length of axletree.....do.....	24.15
Height of wheels.....do.....	12
Distance between wheels on ground.....do.....	19.75
Weight of—	
One wheel.....pounds..	18.5
Body.....do.....	42
Truck complete.....do.....	80
Price of store truck, \$6.25.	

DERRICKS.

There are issued to posts for use in mounting modern seacoast armament—

- 1 boom derrick.

The derrick of this class usually issued is of a capacity of 8 tons, with a mast 45 feet high and a boom with a length of 35 feet and 5

guys. Each derrick is supplied with an extra drum for lowering and raising the boom with weight attached.

SHEARS.

Shears are no longer issued constructed for use, as these can be constructed at posts out of available maneuvering material.

The following sizes of spars will serve as a guide for those required to permit of the raising of the weights given:

Weight.	Diameter.	Length.
<i>Tons.</i>	<i>Inches.</i>	<i>Feet.</i>
2.....	6 to 9	20 to 30
5.....	10 to 14	30 to 40
12 and upward	14 to 20	40 to 45

The prices of shears heretofore issued to the service are as follows:

	Per pair.
2-ton	\$26.70
5-ton	32.37
12-ton	204.97
15-ton	180.56

Sling chains are issued to the service as required, not to exceed 4 per post having 30 or more modern guns mounted, 3 per post having 15 to 30 modern guns, 2 per post having 5 to 15 modern guns, and 1 per post having less than 5 modern guns.

The sling chain is composed of 69 links of 0.75-inch round iron 5 inches long, with a ring of 1-inch iron 8 inches in diameter (exterior) at one end and a hook at the other end. The entire length of the chain is 256.25 inches.

Iron pinch bars 5 and 7 feet in length are issued to the service as required, not to exceed 8 per post having 30 or more modern guns mounted, 5 per post having 15 to 30 modern guns, 3 per post having 5 to 15 modern guns, and 2 per post having less than 5 modern guns.

The 7-foot pinch bar has a maximum diameter of 2.5 inches tapered to 1.5 inches at the end, weighing 53.25 pounds.

Iron hold-posts are issued to posts as required, not to exceed 20 per post having 30 or more modern guns mounted, 15 per post having 15 to 30 modern guns, 10 per post having 5 to 15 modern guns, and 8 per post having less than 5 modern guns.

Iron "pulley blocks" issued to the service are of six kinds, each made with one, two, three, and four sheaves cast brass, and designated and used for the service as follows:

A and B for field and siege guns.

C and D for casemate and garrison gins.

E and F for garrison gins and derricks and maneuvering purposes generally.

The component parts of the various pulley blocks are as follows:

For field and siege guns (Piper).

Name of part.	A (1 sheave).					B (1 sheave).					B (2 sheaves).					Kind of iron.	Price.	
	Num-ber of pieces.	Length.	Width.	Thick-ness.	Weight.	Num-ber of pieces.	Length.	Width.	Thick-ness.	Weight.	Num-ber of pieces.	Length.	Width.	Thick-ness.	Weight.			
Slide plates	2	16	8	Inches. 0.5	Pounds. 18.5	2	10	Inches. 7.5	Inches. 0.375	Pounds. 16.87	2	10	7.5	Inches. 0.375	Pounds. 16.87	Plate		
Partition plates																do		
Crosshead																Hammered		
Do.																do		
Hook	1	10		Inches. 1.75	Pounds. 7.25	1	10	3.25	4	1.75	3.02	1	10	4.75	4	8.87	Plate	
Top thimbles	1	2.25		Inches. 2.5	Pounds. 8	1	10	3.25	4	2	2.76	1	10	4.75	4	8.87	do	
Sheave bolt.	1	4.5		Inches. 1.25	Pounds. 1.625	1	4			1	8.87	1	10			do		
Hook bolt.	1	4.5		Inches. 1.25	Pounds. 1.25	1	4			1	.875	1	4.75			Plate		
Eye-bolt																Bar.		
Sheave-bolt nuts	1	1.5	1.5	Inches. 1.5	Pounds. 6	1	4	1.5	1.5	1.25	2.76	1	4.75	1.25	1.87	Hammered		
Hook-bolt nuts	1	1.5	1.5	Inches. 1.5	Pounds. 6	1	4	1.5	1.5	.5	.25	1	1.5	.5	.25	Bar.		
Crosshead nuts	1	1.5	1.5	Inches. 1.5	Pounds. 6	1	4	1.5	1.5	.5	1.25	1	1.5	.5	1.25	do		
Side eye.																do		
Side ring																do		
Thimble bolt	1	4.5		Inches. 1.25	Pounds. 1.25	1	9	2.5	1.5	.5	1.76	1	8.5	8.5	1.5	do		
Thimble-bolt nut.	1	1.5	1.5	Inches. 1.5	Pounds. 6	1	9	2.5	1.5	.5	.5	1	9	8	1.5	do		
Sheaves	1	2		Inches. 8	Pounds. 14	1	1.25	1.25	8	8.875	7	2	1.25	8.875	14	Brass.		

For casemate and garrison guns (light blocks).

Name of part.	C (2 sheaves).					C (3 sheaves).					C (4 sheaves).					Kind of iron.	Price.
	Num-ber of pieces.	Length.	Width.	Thick-ness.	Weight.	Num-ber of pieces.	Length.	Width.	Thick-ness.	Weight.	Num-ber of pieces.	Length.	Width.	Thick-ness.	Weight.		
Side plates	2	14	8	Inches 0.375	Pounds 25	2	14	8	Inches 0.375	Pounds 25	2	14	8	Inches 0.375	Pounds 25	Plate	
Partition plates	1	14	8	Inches 0.375	Pounds 7.75	1	14	8	Inches 0.375	Pounds 13.5	1	14	8	Inches 0.375	Pounds 23.25	do	
Crosshead	1	5	4	Inches 1.25	Pounds 7	1	7	4	Inches 1.25	Pounds 9.75	1	9.5	4	Inches 1.5	Pounds 14.62	Hammered	
Do	1	5	4	Inches 1.25	Pounds 5	1	7	4	Inches 1.25	Pounds 7	1	9.5	4	Inches 1.5	Pounds 9.62	do	
Hook	1	16	.....	Inches 2.25	Pounds 18	1	16	.....	Inches 2.25	Pounds 18	1	16	.....	Inches 2.25	Pounds 18	do	
Sheave bolt	1	7.5	.....	Inches 1.125	Pounds 2.25	1	9.5	.....	Inches 1.125	Pounds 2.87	1	12	.....	Inches 1.125	Pounds 3.5	Bar	
Eye-bolt	1	6	.....	Inches 2.25	Pounds 6.25	1	5	.....	Inches 2.25	Pounds 6.25	1	5	.....	Inches 2.25	Pounds 6.25	Hammered	
Sheave-bolt nuts	1	1.5	1.5	Inches 1.5	Pounds .62	1	1.5	1.5	Inches 1.5	Pounds .62	1	1.5	1.5	Inches 1.5	Pounds .62	do	
Crosshead nuts	1	1.5	1.5	Inches 1.5	Pounds .75	1	1.5	1.5	Inches 1.5	Pounds .75	1	1.5	1.5	Inches 1.5	Pounds .75	do	
Side eye	1	3.5	3.5	Inches 3.5	Pounds 1.75	1	3.5	3.5	Inches 3.5	Pounds 1.75	1	3.5	3.5	Inches 3.5	Pounds 1.75	do	
Side ring	1	12	5	Inches 5	Pounds .66	1	12	5	Inches 5	Pounds .66	1	12	5	Inches 5	Pounds .66	do	
Thimble-bolt	1	1.75	.....	Inches 7.15	Pounds 35	1	1.75	.....	Inches 7.25	Pounds 39	1	1.75	.....	Inches 7.25	Pounds 39	do	
Sheaves	2	1.75	.....	Inches 7.15	Pounds 35	2	1.75	.....	Inches 7.25	Pounds 39	2	1.75	.....	Inches 7.25	Pounds 39	Brass	

For casemate and garrison gins (heavy blocks).

Name of part.	D (3 sheaves).				D (4 sheaves).				Kind of iron.	Price.
	Num-ber of pieces.	Length.	Width.	Thick-ness.	Weight.	Num-ber of pieces.	Length.	Width.	Thick-ness.	Weight.
Side plates.....	2	15	9	0.375	31	2	16	9	0.375	31
Partition plates.....	2	16	9	0.25	19.25	3	16	9	0.25	28.75
Crosshead.....	1	9	6	1.5	17	1	12	6	1.5	26.25
Do.....	1	16	6	2.75	5.5	1	12	6	2.75	12.62
Hook.....	1	12	12	1.25	22	1	14.5	12	2.25	22
Sheave bolt.....	1	12	12	2.25	7	1	8.75	12	2.25	7
Sheave bolt nuts.....	1	2	2	1.75	7.75	1	2	2	1.75	7.75
Crosshead nuts.....	4	1.5	3.5	1.75	1.75	4	1.5	3.5	1.75	1.75
Side eye.....	1	12	12	.5	6	1	12	12	.5	6
Side ring.....	1	12	2.25	7	51	4	2.25	2.25	7	68
Sheaves.....	3									

For garrison gin (heavy blocks).

Name of part.	E (3 sheaves).				E (4 sheaves).				Kind of iron.	Price.
	Num-ber of pieces.	Length.	Width.	Thick-ness.	Weight.	Num-ber of pieces.	Length.	Width.	Thick-ness.	Weight.
Side plates.....	2	15	9	0.375	31	2	17	10	0.375	38.25
Partition plates.....	2	16	10	0.25	28.75	3	17	10	0.25	38.62
Crosshead.....	1	10.5	6	1.5	17.13	1	12	6	1.5	24.81
Hook.....	1	18	18	2.5	24.75	1	18	18	2.5	24.75
Sheave bolt.....	1	13	6	1.25	8.75	1	15.5	12	1.25	6.25
Eyebolt.....	1	6		3	12	1	6		3	12

For garrison gin, heavy blocks (single and double hook).

Name of parts.	F (3 sheaves).					F (4 sheaves).						
	Num- ber of pieces.	Length. Inches.	Width. Inches.	Thick- ness. Inches.	Weight. Pounds.	Num- ber of pieces.	Length. Inches.	Width. Inches.	Thick- ness. Inches.	Weight. Pounds.	Kind of iron.	Price.
Side plates	2	21.5	12	0.875	44.75	2	21.5	12	0.875	44.75	Plate	
Partition plates	2	21.5	12	0.25	86	2	21.5	12	0.25	86	do	
Hook	1	18	2.5	2.5	24.87	2	18	2.5	2.5	48.75	Hammered	
Top thimbles	3	7	2.5	2.125	7	4	7	2.5	2.125	9.5	Plate	
Bottom thimbles	3	13	2.5	1.5	4.5	4	2.5	2.5	2.125	9.5	Bar	
Sheave bolt	1	18	1.5	10.62	6.5	1	16.5	1.5	2	12.87	do	
Hook bolt	1	12	1.5	8.87	14.5	1	14.5	1.5	1.125	12	do	
Bottom bolt	1	12.5	2.5	1	1.75	1	2.5	2.5	1	1.75	do	
Sheave-bolt nuts	1	2.5	2.5	1	1.75	1	2.5	2.5	1	1.75	do	
Bottom-bolt nuts	1	2	2.5	1	1.12	1	2	2.5	1	1.12	do	
Bottom-bolt	1	2	2.5	1	8.5	1	2	2.5	1	8.5	do	
Side eye	2	3.5	3.5	1.5	3.5	2	3.5	3.5	1.5	3.5	do	
Side flug	2	12	3.5	1.33	1.33	2	12	3.5	1.33	1.33	do	
Sheaves	3	2.25	.....	10	99	4	2.25	.....	10	132	Brass	

Principal dimensions and weights of pulley blocks complete.

Principal dimensions and weights of pulley blocks complete.

	Kind of blocks.					
	1-sheave.		2-sheave.		3-sheave.	
	A.	B.	B.	C.	C.	F.
Weight of block, complete.....	35	30	38	80	100	201.5
Total length of block over all.....	22.5	19.5	19.5	25.5	25.5	31.5
Total width of block over all.....	4	7.5	7.5	9	9	11.5
Total depth over all.....	4	4	6.25	7	7	10.5
Greatest diameter.....	8	4.875	6.875	7.25	7.25	10
Largest rope used with block.....	4.75	3.25	3.25	4.75	4.75	6.25
Price of blocks, complete.....	.....	.....	.....	.....	.....	.....

Price of iron blocks for manuevering purposes.

	Price, each.	Price, each.
Single 2-inch rope.....	\$5.00	\$13.30
Double 2 1/4 rope.....	6.45	21.50
Treble 3-inch rope.....	8.00	30.00
Single 4-inch rope.....	7.60	23.00
Double 4-inch rope.....	13.60	16.50
Treble 4-inch rope.....	21.85	13.30

The following table shows the weight in pounds which manila rope issued by the Ordnance Department will sustain singly and when rove in tackles. Look for the weight to be raised, or the next larger, in the columns headed with the number of sheaves. On the same line in the left-hand column will be found the circumference of the rope required:

Circumference in inches (3-strand).	Number of sheaves in purchase.					
	Single.	2.	4.	5.	6.	7.
1.....	540	1,080	1,350	1,485	1,620	1,755
1½.....	844	1,688	2,110	2,321	2,532	2,743
1½.....	1,215	2,430	3,038	3,342	3,645	3,949
1½.....	1,684	3,368	4,135	4,549	4,962	5,376
2.....	2,160	4,320	5,400	5,940	6,480	7,020
2½.....	2,734	5,468	6,835	7,519	8,202	8,886
2½.....	3,375	6,750	8,438	9,282	10,125	10,969
2½.....	4,084	8,168	10,210	11,231	12,252	13,273
3.....	4,860	9,720	12,150	13,365	14,580	15,795
3½.....	5,704	11,408	14,260	15,686	17,112	18,538
3½.....	6,415	12,830	16,048	17,657	19,245	20,854
3½.....	7,594	15,188	18,986	20,884	22,782	24,681
4.....	8,640	17,280	21,600	23,760	25,920	28,080
4½.....	9,753	19,516	24,393	26,831	29,259	31,697
4½.....	10,935	21,870	27,338	30,072	32,796	35,629
4½.....	12,184	24,368	30,460	33,506	36,522	39,598
5.....	13,500	27,000	33,750	37,125	40,500	43,875
5½.....	14,884	29,768	37,210	40,981	44,652	48,373
5½.....	16,335	32,670	41,838	45,922	49,005	53,089
5½.....	17,954	35,908	44,885	49,373	53,882	58,350
6.....	18,252	36,504	45,630	50,198	55,756	60,319
6½.....	19,805	39,610	49,513	54,465	59,415	64,267
6½.....	21,421	42,842	53,558	58,908	64,268	69,618
6½.....	23,100	46,200	57,750	63,525	69,300	75,075
7.....	24,843	49,786	62,238	68,418	74,529	80,240
8.....	32,448	64,896	81,120	89,292	97,344	105,456

NOTE.—Hemp rope is about one-third stronger. Allowance made in this table for loss of strength by wear and tear.

In ordinary rope the size should always be given in inches and fractions thereof measured on the circumference. The rope generally issued is the 3-strand rope.

To ascertain the strain in pounds a rope will bear without breaking multiply the square of the circumference by the tabular units given in the following table:

Kind of rope.	Circumference.	White.		Tarred.	
		3-strand.	4-strand.	3-strand.	4-strand.
	<i>Inches.</i>				
Hemp	2.5-6	1,140	1,320	850	1,000
	6-8	1,090	1,260	825	940
Manila	2.5-6	810	950	.....	.....
	6-12	760	835	.....	.....

The following table gives the approximate weight per foot, etc., of manila and hemp rope issued to the service:

[Weight per foot, pounds.]

Circumference.	Diameter.	Manila.		Hemp.		Hemp, tarred.	
		3-strand.	4-strand.	3-strand.	4-strand.	3-strand.	4-strand.
<i>Inches.</i>	<i>Inches.</i>						
1	1	0.03	0.03	0.03	0.03	0.04	0.05
1 1/8	1 1/8	.05	.05	.05	.05	.06	.08
1 1/4	1 1/4	.07	.08	.07	.07	.09	.11
1 1/2	1 1/2	.09	.10	.09	.10	.13	.15
2	2	.13	.14	.13	.13	.17	.19
2 1/8	2 1/8	.16	.18	.16	.17	.21	.24
2 1/4	2 1/4	.20	.22	.20	.21	.26	.30
2 1/2	2 1/2	.24	.26	.24	.25	.32	.36
3	3	.28	.31	.28	.30	.38	.43
3 1/8	3 1/8	.33	.37	.33	.35	.44	.51
3 1/4	3 1/4	.39	.43	.39	.40	.51	.59
3 1/2	3 1/2	.45	.49	.45	.46	.59	.68
4	4	.51	.56	.51	.52	.67	.77
4 1/8	4 1/8	.58	.63	.58	.60	.76	.87
4 1/4	4 1/4	.65	.71	.65	.67	.85	.97
4 1/2	4 1/2	.72	.79	.72	.74	.96	1.08
5	5	.80	.87	.80	.82	1.06	1.20
5 1/8	5 1/8	.88	.96	.88	.91	1.16	1.32
5 1/4	5 1/4	.97	1.06	.97	1	1.27	1.45
5 1/2	5 1/2	1.06	1.16	1.06	1.09	1.39	1.59
6	6	1.15	1.26	1.15	1.19	1.51	1.73
6 1/8	6 1/8	1.25	1.36	1.25	1.29	1.64	1.88
6 1/4	6 1/4	1.35	1.48	1.35	1.39	1.77	2.03
6 1/2	6 1/2	1.46	1.59	1.46	1.50	1.91	2.19
7	7	1.56	1.72	1.56	1.62	2.06	2.35
8	8	2.06	2.24	2.06	2.11	2.69	3.07

Price of rope: Manila, 12 1/2 cents per pound; hemp, 12 cents per pound.

Paints and oils issued by the Ordnance Department should always be taken up and carried on property returns in gallons.

The prices and weights per gallon of the various kinds of paint and oils issued are as follows:

	Price.	Pounds.
Graphite, No. 57.....per gallon..	\$1.25	.....
Graphite, No. 38.....do.....	1.25	.....
Lead colored.....per pound..	.11	.....
Olive (quick drying).....do.....	.18	.....
Black (quick drying).....do.....	.22	.....
First coat for 3.2-inch B. L. rifle.....do.....	.12	.....
Second coat for 3.2-inch B. L. rifle.....do.....	.14	.....
Black (for steel horse collars).....do.....	.14	.....
For projectiles:		
Black.....per gallon..	1.00	.....
Blue gray.....do.....	1.95	.....
Warm gray.....do.....	1.95	.....
Olive green.....do.....	1.95	.....
Light green (Quaker drab).....do.....	1.40	.....
Light yellow.....do.....	1.70	.....
Light reddish brown.....do.....	2.07	.....
Vermilion.....do.....	6.14	.....
Dark buff.....do.....	1.30	.....
Deep (chrome) yellow.....do.....	2.14	.....
Linseed oil, boiled.....do.....	.63	.....
Linseed oil, raw.....do.....	.65	.....
Sperm oil.....do.....	.95	7.50
Hydrolene.....do.....	.80	7.12
Synovial oil.....do.....	.16	.....
Kerosene oil.....do.....	.12	.....
Spirits of turpentine.....do.....	.63	7.25
Neat's-foot oil.....do.....	.80	7.63
Japan varnish.....do.....	1.10	7
Spirits of wine (alcohol).....do.....	2.50	5.99

Maneuvering handspikes for general purposes are issued to seacoast posts as required, not to exceed 8 per post having 30 or more modern guns mounted, 5 per post having 15 to 30 guns, 3 per post having 5 to 15 modern guns, and 2 per post having less than 5 modern guns mounted. (Price, \$1.56 each.)

Roller handspikes for general purposes are issued to seacoast posts as required, not to exceed one-half the quantity provided for maneuvering handspikes in previous paragraph.

Maneuvering handspikes, gin, are issued to the service as required, not to exceed 2 to each gin on hand at post. This handspike differs from the general maneuvering handspike in that it has its larger end made round to fit the socket on the garrison gin, the diameter being 3.625 inches and then tapering to $1\frac{1}{4}$ inches at the end. Price, \$1.55 each.

Trace ropes are issued to the service as required, but generally these ropes can be made at posts from rope on hand without making a special requisition for same. They are 30 feet long of $3\frac{1}{4}$ -inch rope.



CHAPTER XII.

SUBMARINE MINE MATERIAL.

The following rules and regulations will be observed in procuring and accounting for submarine mining property:

Requisitions from artillery officers for submarine mining property will be sent to the commandant of the school of submarine defense, who will consolidate them and forward them to the Chief of Artillery. These requisitions when approved by the Chief of Artillery will be referred to the Chief of Ordnance U. S. Army, who will then direct their purchase in accordance with law and regulations.

Requisitions will be made in duplicate on ordnance form (22a) and forwarded quarterly. Special requisitions will be made only in case of emergency.

Only material designed strictly for submarine defense will be supplied, and if articles are needed for this purpose not listed in the Torpedo Manual they will be fully described and the necessity therefor fully stated in the column of remarks.

Prices ruling in the vicinity of the post will be given when known.

The property will be accounted for on a separate semiannual return (Form 1o) to the Chief of Ordnance by the submarine mining officer, and the quarterly statement (Form 33a) showing the stores on hand will be forwarded through each artillery district commander to the Chief of Artillery direct.

The property will be turned over to the Ordnance Department and the proper receipts and invoices exchanged so that it may be taken up on the return for the half year ending June 30, 1903. (G. O. 31, A. G. O., 1903).

Included in the submarine mining property turned over to and hereafter to be supplied, together with such parts of same as may be required, by the Ordnance Department, U. S. Army, through the disbursing officer of the submarine depot, are the following:

OIL ENGINES.

The engines issued to the service are generally of the Hornsby-Akroid pattern of 25, 20, 16, and 4 horsepower. The principal parts of both engines are as follows:

- | | |
|-----------------------------------|----------------------------------|
| 1. Cylinder liner. | 15. Vertical-valve spring. |
| 2. Cylinder casing. | 16. Valve box. |
| 3. Vaporizer. | 17. Valve-box screw cap. |
| 4. Vaporizer cap. | 18. Valve-box coupling. |
| 5. Vaporizer-cap joint ring. | 19. Overflow glass. |
| 6. Vaporizer cover. | 20. Half union. |
| 7. Vaporizer-cover lid. | 21. Oil-pump can. |
| 8. Vaporizer-cover filling piece. | 22. Oil-pump plug. |
| 9. Valve-box journal. | 23. Oil-pump plunger. |
| 10. Valve-box sleeve. | 24. Oil-pump plunger spring. |
| 11. Spray nozzle. | 25. Oil-pump plunger lock nut. |
| 12. Horizontal valve. | 26. Oil-pump plunger head. |
| 13. Horizontal-valve spring. | 27. Oil-pump plunger-head guide. |
| 14. Vertical valve. | 28. Oil-pump gauge. |

- | | |
|----------------------------------|------------------------------------|
| 29. Oil-pump body. | 58. Governor balls. |
| 30. Oil-pump gland. | 59. Governor counterweight. |
| 31. Bed plate. | 60. Governor counterweight lever. |
| 32. Bearing cup. | 61. Governor regulating plate. |
| 33. Splasher. | 62. Governor fork. |
| 34. Oil tank. | 63. Governor fork spindle. |
| 35. Oil filter. | 64. Governor connecting rod. |
| 36. Filter cock. | 65. Governor connecting-rod lever. |
| 37. Work gear. | 66. Valve lever. |
| 38. Gear wheel. | 67. Air-valve cam. |
| 39. Gear guard. | 68. Exhaust-valve cam. |
| 40. Crank shaft. | 69. Cam rollers. |
| 41. Crank-pin oiler. | 70. Lever fulcrum. |
| 42. Oiler elbow. | 71. Lever-fulcrum pin. |
| 43. Piston. | 72. Air-valve lever. |
| 44. Piston rings. | 73. Exhaust-valve lever. |
| 45. Wrist pin. | 74. Cam shifter. |
| 46. Connecting rod. | 75. Locking handle. |
| 47. Connecting-rod head end. | 76. Air-exhaust valve box. |
| 48. Connecting-rod crank. | 77. Air-exhaust valve-box cover. |
| 49. Compression plates. | 78. Air-exhaust valve-box spring. |
| 50. Cam shaft. | 79. Air valve. |
| 51. Governor wheel. | 80. Exhaust valve. |
| 52. Governor pinion. | 81. Cylinder lubricator. |
| 53. Governor gear guard. | 82. Cylinder lubricator cover. |
| 54. Governor bracket. | 83. Cylinder lubricator pulley. |
| 55. Governor spindle. | 84. Fly wheel. |
| 56. Governor counterpoise. | 85. Fly wheel key guard. |
| 57. Governor counterpoise lever. | |

There is issued with each engine complete a tool box containing the following:

For the 4-horsepower engine.

- 8 wrenches, $\frac{1}{2}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and 1 inch.
- 1 filter-cock wrench, $\frac{1}{2}$ -inch square hole.
- 6 springs, Nos. 1, 1, 8, 15, 22, and 29.
- 2 spray-hole cleaners.
- 1 needle case.
- 1 $\frac{1}{2}$ -gallon oil can.
- 1 squirt can, No. 16, 9-inch spout.
- 1 square funnel.
- 1 square yard $\frac{1}{2}$ -inch sheet asbestos.
- 5 square yards $\frac{1}{2}$ -inch round asbestos.

There are issued for use of these engines the following spare parts as required from time to time, viz:

A complete set of such parts should, however, be kept on hand at the post where any of these engines are installed.

For a more complete description of these engines and instructions as to their management, etc., reference should be had to Handbook for Use of Electricians in the Operation and Care of Electrical Machinery and Apparatus of the U. S. Seacoast Defenses, which may be obtained upon application to the Adjutant-General U. S. Army.

ELECTRIC STORAGE BATTERIES.

Electric storage batteries issued as part and in connection with submarine mining property or torpedo outfits are composed of the following principal parts:

- 40 chloride accumulator elements, type D-5
- 46 glass jars for same.
- 165 hard rubber ring separators.
- 48 clamp connections.
- 166 oil insulators.
- 2 hydrometers.
- 1 voltmeter.
- 1 cell tester.
- 1 pair rubber gloves.
- 40 sand trays.
- $\frac{1}{2}$ bushel sand.
- 4 carboys electrolyte (battery solution).
- 1 copy instructions for the installation, care, and maintenance of battery.

SEARCHLIGHT OUTFIT.

United States Government projectors are supplied in the following sizes or diameter of the reflector:

Controls.	Size.	Current.		Carbons.	
		Amperes.	Volts at arc.	Positive (cored).	Negative.
H. or P.	<i>Inches.</i> 18	35	47-50	1 $\frac{1}{2}$ by 8 $\frac{1}{2}$ inches....	1 by 5 inches solid.
H., P., or E.	24	50	48-52	1 by 12 inches	1 by 7 inches cored.
H. or E.	30	80	49-53	1 $\frac{1}{2}$ by 12 inches....	1 by 7 inches cored.
H. or E.	36	120	50-55	1 $\frac{1}{2}$ by 12 inches....	1 by 7 inches cored.

= Hand, H.; pilot-house, P.; electric, E.

The methods of control for the searchlights are of three kinds—hand control, pilot-house control, or electric control.

Hand control.—The hand control projector is provided with a star wheel mounted on the arm which clamps the quadrant part of the trunnion and acts as a locking device by means of which the barrel of the projector may be held at any desired angle.

The complete hand-controlled projector consists of the following parts:

The base with all the gears; turntable with arms and drum.

- 1 mirror.
- 1 front door with plain glass.
- 1 front door with diverging glass.
- 1 box for front doors.
- 1 lamp.
- 1 rheostat.
- 1 canvas cover.
- 125 positive carbons in tin boxes.
- 125 negative carbons in tin boxes.
- 1 extra set of plain glass front-door strips.
- 1 plain wooden box.

There is furnished with each hand-controlled projector 1 tool box containing the following tools and spare parts and materials:

- 1 crank-handled socket wrench for lamp feed.
- 1 wooden-handled socket wrench for adjusting carbons.
- 1 smoked glass with frame.
- 1 dustbrush.
- 1 small dusting brush for lamp.
- 1 chamois skin for polishing mirror.
- 1 spare spring for starting magnet.
- 1 spare spring for feeding magnet.
- 1 contact spring.
- 1 contact screw.
- 2 round smoked glasses.
- 1 round ground glass.
- 2 pairs of carbon holder clamps, screws and washers.
- 43 extra lava insulators.
- 1 small wrench for 8-32 and 10-32 nuts.

Pilot-house controlled projector.—The pilot-house controlled projector has the same apparatus except pedestal, but in addition rope and guide pulleys, and also a tool box with a complete set of tools, spare parts and materials as furnished for the hand-controlled projector.

Electrically controlled projector.—The electrically controlled projector has the same component parts as the hand-controlled projector, with the following additional ones:

- 1 controller stand and a canvas cover.
- 1 controller cable 25 feet long, with connecting plugs at each end.
- 1 controller receptacle.

Also the following additional spare parts to those enumerated for the hand controller contained in the tool box:

- 2 pairs of carbon brushes for motors.
- 2 20-ampere fuses for controller.
- 6 8-32 nuts.

The lamp mechanism of all projectors consists of the following principal parts:

- A. Negative-carbon holder.
- B. Positive-carbon holder.
- C. Clamping screws for carbon clamps.
- D. Vertical screw positive-carbon clamp.
- E. Horizontal screw positive-carbon clamp.
- F. Negative-carbon support.
- G. Positive-carbon support.
- H. Lamp frame.
- K. Main-lamp contact shoes.
- L. Hand-feed screw.
- M. Fixed nut for focusing screw.
- N. Stud of lamp switch for cutting out feeding magnet.
- O. Ratchet and pawl.
- P. Feeding-magnet armature.
- Q. Contact of circuit breaker.
- R. Adjusting screw for ratchet arm.
- S. Starting magnet.
- T. Feeding.

U. Adjusting spring for feeding magnet.

The parts of the electrically controlled projector and controller are principally as follows:

- A. Hand star wheel for slow vertical movement.
- B. Wheel for throwing out split nut used for connecting or disconnecting the drum from the base mechanism.
- C. Wheel for slow horizontal movement.
- D. Hand star wheel for clamping turntable to center pin for electrical control.
- E. Wood handles on drum for moving drum by hand.
- F. Hand wheel for clamping hand star wheel A when electric control is used.
- G. Controller switch.
- H. Controller handle.
- I. Controller fuse box.
- J. Controller coupling for connecting cable from the projector.
- K. Focusing screw.
- L. Socket for inserting wrench to operate lamp switch used for cutting out feeding magnet.
- M. Socket for inserting wrench when feeding by hand.
- N. Door used for adjusting the carbons and for cleaning the front door.
- O. Door used when carbons are to be adjusted or changed.
- P. Front door.
- Q. Door used when adjusting negative carbons or cleaning the mirror.
- R. Horizontal peep sights.
- S. Vertical peep sights.
- T. Sliding case to be opened when lamp mechanism is to be inspected.
- U. Projector main switch.
- V. Latches for fastening base sheeting.
- W. Base sheeting.

For more complete description and instructions for the management of search-lights, their installation, etc., see Handbook for the Use of Electricians in the Operation and Care of Electrical Machinery and Apparatus of the U. S. Seacoast Defenses.

The spare parts and materials for use of these lights will be issued from time to time in such quantities as may be required to replenish those usually carried in the tool chest as provided in paragraph —, or such additional ones as may be needed. This should be made in accordance with provisions of General Orders, No. 31, A. G. O., 1903.

SWITCH BOARDS.

Switch boards complete issued as part of the complement which go to make up part of the electrical outfit in connection with submarine mining property is carried as a "Switch board complete," and is 48 by 37 by 15½ inches in size, made of cherry, with four slide covers and the following principal parts, viz:

- 1 Lewis automatic cut-out.
- 3 rheostats.
- 1 Weston voltmeter.
- 1 Weston ammeter.
- 1 pole changer (reversing key).
- 2 3-ampere porcelain fuse blocks.
- 2 12-ampere porcelain fuse blocks.
- 2 double-pole double-throw switches.
- 1 3-way switch.
- 1 8-point voltmeter switch.
- 16 binding posts and wiring.

Four tool boxes are issued to such posts as may be equipped with submarine mining property, and are known as tool box A, B, C, and D. They are taken up and carried on the returns by their lettered nomenclature "complete."

These tool boxes contain the following tools and implements:

Tool box A (casemate use only).

1 hacksaw.	1 6-inch tool handle and tool.
1 hatchet.	1 soldering capper.
1 hickory mallet.	1 gluepot.
1 riveting hammer.	1 rule, 1-foot.
6 camel's-hair pencils.	1 screw-driver.
1 oiler.	1 oilstone.
1 chisel, one-fourth inch, for wood.	1 pair shears.
1 Stevens vice.	1 hand vise.
1 combination wrench, 6-inch.	3 files, assorted.
2 pairs pliers, small.	1 dustbrush for apparatus.
1 pair nippers, small.	

Tool box B.

2 button brushes.	1 oiler.
1 cold chisel.	1 pinchers, large.
2 cutting pliers, large.	1 round-nose pliers.
1 file, 14-inch, flat bastard.	1 screw-driver.
2 files, 6-inch, flat.	1 metallic tape.
1 hammer, smith's.	1 soldering capper.
1 hatchet.	1 hand vise.
1 monkey wrench, 15-inch.	1 marline spike.
3 S wrenches.	2 pairs scissors.
1 Stillson wrench, 18-inch.	1 T wrench.
1 red marking crayon.	

Tool box C.

2 cold chisels.	2 cutting pliers, large.
2 S wrenches.	2 files, 6-inch, flat.
1 T wrench.	2 pairs scissors.
1 hand vise.	1 monkey wrench, 15-inch.
1 hammer, smith's.	1 hammer, ball pine.
2 pinchers.	2 marline spikes.
1 100-foot measuring tape.	

Tool box D.

2 cutting pliers, large.	2 files, 6-inch, flat.
2 scissors.	1 monkey wrench, 15-inch.
1 hammer, ball pine.	2 earth plates.
2 T wrenches.	2 round-drive punches.
2 pinchers.	

The tools and implements contained in these various boxes will be supplied from time to time as required to replace those worn out, broken, or lost, in the manner as provided by general orders.

PORTABLE TESTING SETS.

Portable testing sets, with batteries, are issued to posts equipped with submarine mining outfit.

This set is a Wheatstone bridge and galvanometer combined. It is contained in a heavy, compact, hard-wood box and used for testing for insulation and core resistance. The battery used with this set will be carried separately on the property return as "Battery complete" for portable testing set.

BALANCE AND WEIGHTS.

The small balance and weights issued for use of submarine mining property are packed in a walnut case 15 by 7 by 4½ inches and are made of polished brass, consisting of—

Column.

10-inch beam.

2 trays.

1 mahogany case, containing the following weights—

Brass: One 12-ounce, One 6-ounce, One 3-ounce, One 2-ounce, One 1-ounce, One ½-ounce, One 2-dram, One 1-dram, One ½-dram, One 2-scruple, One 1-scruple.

Aluminum: One 10-grain, One 5-grain, Two 2-grain, One 1-grain, One ½-grain, One ¼-grain.

CHAPTER XIII.

SIEGE BATTERIES. MATERIALS FOR, ETC.

5-INCH B. L. RIFLE (SIEGE) BATTERY.

For complete details as to care, instructions for operation, etc., see pamphlet issued by Ordnance Department, "Handbook of Material for 5-inch Siege Rifle Battery."

The equipment of a 5-inch siege battery consists of 4 5-inch B. L. rifles, carriages, and limbers, drawn by 8 horses, 4 ammunition wagons drawn by 8 horses, 1 forge and battery wagon drawn by 6 horses, 1 artillery store wagon drawn by 4 horses, and 1 implement wagon drawn by 8 horses. The harness required to equip the battery is 11 sets of wheel harness for two, and 30 sets of lead harness for two horses, and 41 harness sacks.

NOTE.—Three of the artillery ammunition wagons will be used as ammunition wagons and one as an implement wagon.

The ammunition wagons will be replaced by eight caissons as soon as the latter have been designed and manufactured.

Six army wagons, of standard pattern, each drawn by six mules, will be furnished by the Quartermaster's Department to each battery when needed on marches and in the field.

The mule harness is the regulation harness used by the Quartermaster's Department.

WEIGHT, DIMENSIONS, ETC., 5-INCH B. L. RIFLE (SIEGE), MODEL 1890.

Weight, 3,600 pounds.
Distance between rimbases, 15 inches.
Length of trunnions, 3.3 inches.
Distance of axis of trunnions from muzzle, 96.25 inches.
Total length, 12.15 feet.
Length of bore, 27 calibers.
Maximum diameter of breech, 15 inches.
Diameter of muzzle, 8 inches.
Diameter of trunnions, 5.8 inches.
Powder chamber:
Diameter, 5.7 inches.
Length, 15.15 inches.
Capacity, 402.5 cubic inches.
Travel of projectile in bore, — caliber, 119.8 inches
Projectile:

Kind.	C. I. shell.	C. S. shell.	Shrapnel.
Weight (filled and fused).....pounds..	45	45	45
Ratio of weights to weight of piece.....	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{12}$
Weight of bursting charge (rifle powder).pounds..	2.30	1.29	2.4
Length.....calibers..	8	2.5	2.30
Sectional density.....	2.30	2.30	2.30
Price.....	\$5.00	\$5.50	\$6.00

^a Maximite or explosive D.

^b Ounces.

^c Without fuse.

Powder:

Kind, sphero-hexagonal and smokeless.

Weight, 13 pounds sphero-hexagonal; 4.25 pounds smokeless.

Density of loading, 0.9096 sphero-hexagonal; 0.02923 smokeless.

Muzzle velocity:

Sphero-hexagonal, 1,830 feet per second.

Smokeless, 1,830 feet per second.

Maximum pressure per square inch:

Sphero-hexagonal, 35,000 pounds.

Smokeless, 30,000 pounds.

Muzzle energy:

Sphero-hexagonal, 1,045 foot-tons.

Smokeless, 1,045 foot-tons.

Rifling:

Number of grooves, 30.

Width of grooves, 0.3738 inch.

Depth of grooves, 0.5 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, one turn in 25 calibers at — inches from muzzle, being uniform over the — inches.

POWDER NOTE.—The weights are approximate for charge. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges, and should always be obtained from the office of the Chief of Ordnance when doubt exists as to the proper charge for a given lot of powder on hand at any post.

5-INCH B. L. SIEGE RIFLE, MODEL 1890.

The designation "One (1) 5-inch B. L. rifle, model 1890," in correspondence, invoices, receipts, requisitions, etc., comprises the gun proper, with its attached parts and breech mechanism, complete, as per list below.

In filling a requisition for a gun of this model, it is customary to issue thereon the following articles, which are mentioned in the invoice: One rear sight (tangent), one rear-sight pouch, one front sight (tangent) with four screws, one front-sight cover, one telescopic sight (with case). (Par. II, Ord. Order No. 41, s. 1885.)

List of parts in "One breech mechanism, complete," for 5-inch B. L. rifle, model 1890.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One block carrier, complete:					
Hinge pin	1	Steel....	Hinges block carrier to gun.	Interchangeable all guns this model.	Carrier-ring hinge pin.
Hinge-pin screw....	2	....do....	Secure hinge pin in block carrier.	....do.....	
Block carrier.....	1	....do....	Encloses breechblock.	....do.....	Carrier ring.
Block stop.....	1	....do....	Through block carrier, near hinge; governs motion of breechblock in block carrier.	Requires careful fitting to individual block carrier.	Stop bolt, guide bolt, stop.
Block-stop screw...	1	....do....	Secures stop in block carrier.	Interchangeable all guns this model.	Stop-bolt screw.
Vent cover guide-cover.	1	....do....	Covers vent-cover guide slot in block carrier.	....do.....	Guide cover, guideway cover.
Vent cover guide-cover screws.	2	....do....	In guide cover .....	....do.....	
Carrier latch bolt...	1	Norway iron.	In latch recess in block carrier.	....do.....	Latch, latch pin, latch bolt.
Carrier latch spring.	1	Steel....	Behind latch bolt in latch recess.	....do.....	

List of parts in "One breech mechanism, complete," for 6-inch B. L. rifle, model 1890—
Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One block carrier, complete—Cont'd. Carrier latch cover .	1	Steel...	Covers latch recess in block carrier (opposite hinge).	Interchangeable all guns this model.	Latch housing.
Carrier latch screws	2	....do...	Secure latch cover to block carrier.	....do	Latch-cover screws, latch housing screws.
One breech block, complete: Breechblock	1	....do...	In breech of gun; secured to block carrier by block stop (and when breech open by latch bolt).	....do	Breech plug, breech screw.
Block handle.....	1	Bronze.	Rear end of breechblock.	....do	Handle.
Block handlescrews	2	Steel...	In handle	As issued, fit any gun; if removed, can not be used again, on account of fn.	Handle screws.
Block lever.....	1	....do...	Rear end breechblock in lugs.	Interchangeable all guns this model.	Lever, rotating lever handle.
Block-lever pivot...	1	....do...	Through block lever and lugs on breechblock.	....do	
Block-lever screw ..	1	....do...	Through block lever into block-lever pivot.	....do	Lever handle, set screw.
Vent cover, proper.	1	....do...	In rear of breechblock, covering vent.	....do	
Vent-cover lever ...	1	....do...	In mortise in breechblock, supporting vent cover.	....do	Vent-cover lever bar.
Vent-cover stud	1	....do...	Outer end of vent-cover lever operates vent cover.	....do	
Vent-cover stop screw.	1	....do...	Screwed into rear of breechblock and into slot in vent-cover lever.	....do	Vent-cover lever pin.
Vent-cover nut.....	1	....do...	Screwed on end vent-cover lever, holding vent cover.	....do	Vent-cover lever nut.
One obturator, complete: Obturator spindle, complete— Obturator spindle.	1	....do...	Through center bore of breechblock.	Spindle and nut not issued separately, account of spindle-screw seat, spindle and nut fit any gun this model.	Spindle, obturator, mushroom, mushroom head and spindle. (The term "obturator" should never be used for "obturator spindle.")
Obturator nut	1	....do...	Rear end of spindle .....	....do	Spindle nut.
Obturator spline screw.	1	....do...	Halved in spindle and nut.	Interchangeable all guns this model.	Obturator-nut spline screw.
Vent bushing	1	Copper.	In front end obturator spindle.	Not removable; as issued, fit all guns this model.	
Obturator spring ...	1	Steel...	On obturator spindle, in front of nut.	Interchangeable all guns this model.	Obturator.
Front split ring	1	....do...	On obturator spindle, between pad and head of spindle.	....do	
Rear split ring	1	....do...	On obturator spindle, between gas-check disk and gas-check pad.	....do	
Small split ring	1	....do...	On obturator spindle, rear inner edge of pad.	....do	Spindle split ring.
Gas-check pad.....	1	Asbestos and tallow incanvax.	On obturator spindle, between front and rear split rings.	....do	Pad, gas check.

List of parts in "One breech mechanism, complete," for 5-inch B. L. rifle, model 1890—
Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One obturator, complete—Continued.					
Filling-in disk.....	1	Steel....	On obturator spindle, between breech-block and gas-check pad.	Interchangeable all guns this model.	Gas-check disk.
Retracting stud	1	....do....	Recess at breech for block carrier (screws in R. H. thread).	....do.....	Operating stud, conical stud, latch stud.
Rear-sight socket....	1	....do....	In dovetail slot, right side breech.	Not to be removed unless broken; must be filed to a close fit.	Rear-sight socket.
Rear-sight socket screw.	1	....do....	Riveted in sight socket.	Not to be removed.	
Telescopic-sight bracket.	1	Bronze ..	On right trunnion....		
Telescopic-sight bracket screw.	1	Steel....	On right trunnion....	(c)	
or	3				
Lifting eyebolt.....	1	....do....	Screwed into top of trunnion hoop.	Interchangeable all 5-inch siege guns and 7-inch howitzers that are drilled foreyebolt.	

^a Two kinds of telescopic-sight brackets have been made. The old form was fastened to the gun by three screws. The new form is fastened to the gun by a dovetail slot and one screw. The guns fitted for the old form will be altered to receive the new as they can be spared from service. The screws for the two brackets are of different dimensions. Regulations should state which bracket and screws are wanted.

Price of rifle, complete, \$2,445.

WEIGHT, DIMENSIONS, ETC., 5-INCH B. L. RIFLE (SIEGE), MODEL 1896.

Weight, 3,639 pounds.
Distance between rim bases, 15 inches.
Length of trunnions, 3.3 inches.
Distance of axis of trunnions from muzzle, 95.8 inches.
Total length, 11.91 feet.
Length of bore, 27 calibers.
Maximum diameter of breech, 15 inches.
Diameter of muzzle, 8 inches.
Diameter of trunnions, 5.8 inches.
Powder chamber:
Diameter, 5.7 inches.
Length, 15.15 inches.
Capacity, 402.5 cubic inches.
Travel of projectile in bore, — caliber, 119.8 inches.
Projectile:

Kind.	C. I. shell.	C. S. shell.	Shrapnel.
Weight (filled and fused).....pounds..	45	45	45
Ratio of weight to weight of piece	^a 2.8	^a 1.2	^b 1.2
Weight of bursting (rifle powder).pounds..	8	2.6	^c 2.4
Length .....calibers..	2.80	2.80	2.80
Sectional density.....			
Price, see page —.			

^a Maxinite or explosive D.

^b Ounces.

^c Without fuse.

Powder:

Kind, sphero-hexagonal and smokeless.

Weight, 13 pounds sphero-hexagonal; 4.25 pounds smokeless.

Density of loading, 0.9066 sphero-hexagonal; 0.2923 smokeless.

Muzzle velocity:

Sphero-hexagonal, 1,830 feet per second.

Smokeless, 1,830 feet per second.

Maximum pressure per square inch:

Sphero-hexagonal, 35,000 pounds.

Smokeless, 30,000 pounds.

Muzzle energy:

Sphero-hexagonal, 1,045 foot-tons.

Smokeless, 1,045 foot-tons.

Rifling:

Number of grooves, 30.

Width of grooves, 0.3736 inch

Depth of grooves, 0.5 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, one turn in 25 calibers at — inches from muzzle, being uniform over the — inches.

POWDER NOTE.—See note on model 1890 rifle, page 394.**5-INCH B. L. SIEGE RIFLE, MODEL 1898 AND 1898 M1.**

The designation "One 5-inch B. L. siege rifle, model 1898 (or 1898 M1.)" in correspondence, invoices, receipts, requisitions, etc., comprises the gun proper, with its attached parts and breech mechanism complete, as per list below.

The breech mechanisms for these two models are identical in general and correspond in number and name of parts, but some parts are of different dimensions.

List of parts in one breech mechanism for 5-inch B. L. siege rifle, model 1898 (or 1898 M1.).

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One block carrier, complete:					
Hinge pin	1	Steel ...	Hinge block carrier to gun.	Interchangeable 5-inch guns of same model.	Block carrier hinge pin.
Block carrier	1	...do...	Supports breechblock; hinged to gun.	.....do.....	
Spindle key	1	...do...	Screwed to block carrier; extends through breechblock into obturator spindle.	Interchangeable 5-inch guns, models 1898 and 1898 M1.	
Spindle-key screw..	1	...do...	Fastens spindle key to block carrier.	.....do.....	
Carrier-latch bolt...	1	...do...	In block carrier; latches carrier to gun, and serves as stop for breechblock.	.....do.....	Latch bolt.
Carrier-latch lever ..	1	...do...	In block carrier; engages in carrier latch bolt.	.....do.....	Latch lever.
Carrier-latch pivot ..	1	...do...	In block carrier, and through carrier latch lever.	.....do.....	Latch-lever pivot
Carrier-latch spring..	1	...do...	In block carrier, behind carrier latch lever.	.....do.....	Latch spring.
Operating lever	1	...do...	Pivoted to lug, lower part block carrier.	.....do.....	Lever.
Operating pinion...	1	...do...	On operating pinion pivot.	.....do.....	Pinion.
Operating-pinion pivot.	1	...do...	Screwed into lug, lower part block carrier.	.....do.....	Pivot.

List of parts in one breech mechanism for 5-inch B. L. siege rifle, model 1898 (or 1898 M1.)—Continued.

Official name of part.	No.	Material.	Location, etc	Remarks.	Synonymous names used in service, shops, etc.
One block carrier complete—Cont'd.					
Operating-pinion pivot nut.	1	Steel ...	Screwed on lower end of pivot.	Interchangeable 5-inch guns, models 1898 and 1898 M1.	Pivot nut.
One breech block, complete:					
Breechblock	1	do ...	In breech recess.....	Interchangeable all guns same model.	Segment and rack.
Gear segment.....	1	Bronze ...	Attached to rear end of breechblock.	Interchangeable 5-inch model 1898 and 1898 M1.	
Gear-segment screws	1	Steel ...	Screw gear segment to breechblock.	do	
Firing-attachment operating pin.	1	do ...	On upper side gear segment.	do	
Firing-attachment operating-pin screw.	1	do ...	do	do	
Breechblock oil-hole screw.	1	do ...	do	do	
One obturator, complete:					
Obturator spindle, complete—					
Obturator spindle			In center bore of breechblock.	do	
Vent bushing.....			In front end of obturator spindle.	do	
Obturator nut			On rear end of obturator spindle.	do	
Firing attachment, complete.					
Slide housing.....	1	Steel ...	Attached to rear end of spindle.	Interchangeable ...	Housing.
Ejector slot.....			Cut in slide housing.	do	
Slide-housing firing groove.			do	do	
Slide-housing guides.		Steel ...	do	do	
Slide-housing spline screw.	1	do ...	Secures housing to spindle.	Interchangeable ...	
Slide stop.....	1	do ...	Screwed into right side of slide housing.	do	Stop screw.
Slide	1	do ...	Slides in slide-housing guides.	do	
Slide handle	1	do ...	Screwed into top of slide.	Not interchangeable.	
Ejector	1	do ...	Seated in rear face of housing.	Interchangeable ...	Primer ejector.
Ejector roller	1	do ...	Lies in slot in slide.	do	Loose-pin roller.
Ejector-roller shutter.	1	do ...	Retains roller in slide.	do	Roller shutter.
Ejector-roller shutter screw.	1	do ...	Pivots shutter to slide.	do	Roller-shutter screw.
Firing leaf	1	do ...	Pivoted to slide.	do	
Firing-leaf safety pin.			Formed on firing leaf.	do	Safety lug.
Firing-leaf spring.	1	Steel ...	On top of slide.	Interchangeable ...	Leaf spring.
Firing-leaf pivot.	1	do ...	Pivots leaf to slide.	do	
Front split ring.....			Between head of obturator spindle and gas-check pad.	Interchangeable all 5-inch guns model 1898 and 1898 M1.	Exterior split ring, front.
Rear split ring.....			Between filling-in disk and gas-check pad.	do	Exterior split ring, rear.
Small split ring.....			On obturator spindle in rear of gas-check pad.	do	Interior split ring.
Gas-check pad.....			On obturator spindle between split ring.	do	Pad.
Filling-in disk.			On obturator spindle in front of breechblock.	do	
Obturator ball-bearing washer (one per gun)—					
Cups.....	2	Steel ...	(On obturator spindle forward of obturator nut and in rear of interior shoulder in breechblock.	(Interchangeable all 5-inch guns model 1898 and 1898 M1; washers issued as a whole only.	Washer rings. Washer clamps.
Connector.....	1	Copper ...			
Balls	23	Steel ...			Spindle ball washer.

List of parts in one breech mechanism for 5-inch B. L. siege rifle, model 1898 (or 1898 M1.)—Continued.

PARTS ATTACHED TO GUN PROPER, BUT REMOVABLE.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Carrier-latch cam bolt.	1	Steel ...	On breech face of gun, left side.	Not interchangeable. Requires fitting.	Tripping stud.
Carrier-latch seat bolt.	1	...do ...	...do ...	...do ...	Latch-bolt seat.
Hinge	1	...do ...	On breech face of gun, right side.	Interchangeable model 1898 only; hinge solid on jacket in 1898 M1.	Block carrier hinge plate.
Hinge screws.....	6	...do ...	...do ...	Interchangeable model 1898 only; not present in model 1898 M1.	
Rear-sight socket.....	1	...do ...	On breech face of gun, left side.	Not interchangeable.	
Rear-sight socket screw.	1	...do ...	...do ...	Interchangeable ...	
Telescopic-sight bracket.	1	Bronze.	On right trunnion....	Interchangeable all 5-inch guns model 1898 and 1898 M1.	
Telescopic-sight bracket screws.	1 or 3	Steel ...	...do ...	...do ...	
Lifting eyebolt.....	1	...do ...	On top of trunnion hoop.	Interchangeable ...	

Price of rifle complete, \$1,883.

NOTE.—The hinge pins of the breech mechanism of these guns are in the future to be provided with oil groove and screw.

SPARE PARTS OF GUN.

Spare parts are issued for 5-inch breech-loading rifle (siege) and carried in one of the available compartments of the forge and battery wagon, artillery store wagon, or other army conveyance with siege train. They are as follows:

Estimated one year's supply—all expendable.	Price each.
4 obturator springs.....	\$3.50
6 carrier latch bolts.....	2.00
12 carrier latch-springs.....	.50
4 gas-check pads.....	3.50
2 front split rings.....	8.50
2 rear split rings.....	8.50
2 small split rings.....	4.00
6 vent bushings, copper.....	.....
4 hinge-pin oil hole screws.....	.25
4 breech block oil hole screws.....	.25

The following spare parts for breech mechanisms of 5-inch B. L. rifles are kept on hand at arsenals, and will be issued from time to time as required:

For 5-inch B. L. rifle, model 1890.

Parts.	Price each.
Hinge pins.....	\$4.50
Hinge-pin screws.....	.50
Block stops.....	4.00
Block-stop screws.....	.50
Carrier latch covers.....	4.50
Carrier latch screws.....	1.00
Vent covers.....	8.00
Vent-cover bar.....	2.00
Vent-cover stop screw.....	4.00
Vent-cover nut.....	.50
Block-lever pivot.....	8.50
Block-lever screws.....	.25
Retracting studs.....	1.50

For 5-inch B. L. rifle, model 1898 and 1898 M1.

Parts.	Price each.
Obturator nuts	\$4.50
Obturator ball bearing washer.....	13.00
Obturator spline screws .....	.65
Hinge pins	4.00
Carrier latch bolts	6.00
Carrier latch seat bolt.....	14.00
Carrier latch seat bolt screw	1.30
Carrier latch cam bolt.....	12.00
Carrier latch cam bolt screws	1.30
Operating-lever catches	1.50
Operating-lever catch springs.....	.65
Firing attachments complete.....	80.00

In ordering spare parts always give the name of maker, model, and number of gun for which parts are required. All unserviceable spare parts, when replaced by new ones, should be turned into Watervliet Arsenal.

SIGHTS FOR 5-INCH B. L. SIEGE RIFLE.

[See Handbook of Sights for Cannon, 1899.]

FRONT SIGHT.

The front sight is fastened by four screws to a seat on the rimbases of the gun. It is composed of the following principal parts:

No.	Official name of part.	Material.	Price each.
1	Base	Bronze	
1	Cross carrier.....	Brass	
1	Wire cross	Steel ribbon	
1	Cross carrier securing screw.....	Brass	
4	Screws for securing base.....	do	
	Total		\$6.50

The later model of front sight differs from the earlier models only in its additional strength to resist bending.

REAR SIGHT.

(Graduated to 12 degrees. Not graduated for range or time.)

The rear sight fits into a socket on the rear of the gun and is composed of the following principal parts:

No.	Official name of part.	Material.	Price each.
1	Graduated vertical limb.....		
1	Base		
1	Trunnion.....		
1	Deflection scale		
1	Spirit level		
1	Deflection screw.....		
1	Elevating screw		
1	Sighting leaf		
1	Vernier.....		
1	Adjusting screw of spirit level.....		
1	Trunnion clamping screw.....		
1	Seating pin.....		
	Total		\$25.00

The later model of rear sight differs from the earlier model in that it has a wider slot, a stronger brass tube for level, and more efficient trunnion clamping screw, and

a notch in the sliding leaf for use with the direction sight of the front sight. All rear sights for these guns are to be graduated for range (shell) and range and time of flight (shrapnel) in addition to scale of degrees.

TELESCOPIC SIGHTS.

Telescopic sights are also issued with the siege rifles, one for each rifle, with necessary sight brackets. For full description and instructions for their use see "Handbook of Telescopic Sights," issued by the Ordnance Department.

AZIMUTH INSTRUMENTS.

Azimuth instruments, complete, with tripod and pier mount and cover, are issued to siege batteries as part of the regular equipment, two to each battery. For full description, etc., see pamphlet "Description of Azimuth Instruments, Model 1900," issued by Ordnance Department.

RANGE FINDERS.

Two Weldon range finders are issued to each siege battery as part of its equipment.

GUNNERS' QUADRANTS.

One gunners' quadrant is issued with each siege rifle. For full description, etc. see "Handbook of Sights for Cannon, 1899," issued by the Ordnance Department. For list of component parts see page 325.

STOP WATCHES—TIME-INTERVAL RECORDERS.

Stop watches are issued to siege batteries on basis of three per battery.

SOUND TELEMETERS.

Sound telemeters are issued to siege batteries on basis of two per battery.

FUSES.

Fuses used for projectiles for 5-inch B. L. rifle (siege) are:

High resistance base fuse A for shell of earlier manufacture. For prices see page 345.

Low resistance base fuse W for shell of later manufacture. For prices see page 346.

High resistance base fuse C for shell. For prices see page 346.

High resistance 15-second combination fuses for shrapnel. For prices see page 347.

For component parts of fuses see pages 345-347, 348-350.

PRIMERS.

The following primers are used with 5-inch B. L. rifle (siege):

Obturator friction primers (with screw-thread for old model vents). For prices see page 352.

Obturator friction primers for siege cannon with screw-thread (model 1902). For prices see page 352.

Obturator electric primer (single wire screw thread). For prices see page 352.

For full description of fuses, see pamphlet "Fuses for field, siege, and seacoast Powder-Charged Shell and Shrapnel," issued by Ordnance Department.

For list of spare parts issued with these guns see page 399.

For allowance of materials, supplies, etc., see pages 446-450.

The ammunition for the siege rifle is packed for shipment and storage in wooden cases, with handles at each end, containing two complete rounds in each—shell or shrapnel—filled and fused, powder charges in hermetically-sealed cases, and three obturator primers.

5-INCH SIEGE-RIFLE CARRIAGE, MODEL 1892.

Total weight of carriage, — pounds.

Total weight of limber, — pounds.

List of parts, location, and material, with correct nomenclature.

Number.	Official name of part.	Location, etc.	Material.
	Parts of trail:		
a1	Flasks.....	Form trail.....	Steel.
a1	Brace plates.....	Riveted to flasks.....	Do.
1	Front transom.....	Riveted between flasks.....	Do.
1	Rear transom.....	do.....	Do.
1	Top plate.....	Riveted to top of flasks.....	Do.
1	Bottom plate.....	Riveted to bottom of flasks.....	Do.
1	Firing-bracket plate.....	Riveted to top plate.....	Do.
1	Firing bracket.....	Riveted to bracket plate.....	Do.
1	Firing-bracket washer plate.....	do.....	Do.
1	Firing-bracket pin.....	Piston-rod eye to bracket.....	Do.
1	Hinge pin.....	Riveted to top plate.....	Do.
1	Reinforce plate.....	do.....	Do.
1	Bolster angle.....	Riveted to reinforce plate.....	Do.
1	Bolster.....	Riveted to bolster angle.....	Wood.
	Upper step:		
1	Step plate.....	Hinged to riser.....	Do.
2	Riser.....	Hinged to hinge eyes.....	Steel.
1	Hinge eyes.....	Riveted to reinforce plate.....	Do.
2	Hinge pins.....	Riser to step plate and eyes.....	Do.
1	Hinge pin.....	Step plate to hinge plate.....	Do.
1	Hinge-pin key.....	In hinge-pin eye.....	Do.
	Lower step:		
1	Step plate.....	Hinged to riser.....	Do.
1	Riser.....	Hinged to eyes.....	Do.
1	Lunette plate.....	Riveted to bottom plate.....	Do.
1	Trail-shoe plate.....	Riveted to bottom plate and flasks.....	Do.
1	Maneuvering bracket.....	Riveted to shoe plate.....	Do.
2	Maneuvering bolt.....	Through trail.....	Do.
1	Maneuvering rollers.....	Ends of bolt.....	Bronze.
1	Maneuvering-bolt nut.....	End of bolt.....	Steel.
a1	Travelling trunnion brackets.....	Riveted to flasks.....	Bronze.
a1	Trunnion beds.....	Bolted to flasks.....	Steel.
8	Trunnion-bed bolts.....	Beds to flasks.....	Do.
4	Cap-square eyebolts.....	Bolted to flasks.....	Do.
2	Cap squares.....	On trunnion beds.....	Do.
4	Cap-square bolt keys.....	In eyebolts.....	Do.
4	Bolt-eye chains and eye studs.....	Studs screwed into flasks.....	Do.
1	Axle plate, upper.....	Between flasks and axle.....	Do.
1	Axle plate, lower.....	Riveted to upper plate.....	Do.
2	Axle blocking.....	Between axle plates.....	Do.
	Wheels and axle:		
1	Axle.....	do.....	Do.
2	Eye straps.....	Shrunk on ends of axle.....	Do.
2	Wheels.....	On axle spindles.....	Do.
2	Linchpins.....	Ends of spindles.....	Do.
2	Linchpin clasps.....	Riveted to linchpins.....	Do.
2	Linch washers.....	Between nave and linchpin.....	Do.
	Hydraulic buffer, etc.:		
1	Cylinder.....	Under carriage.....	Do.
1	Front cap.....	End of cylinder.....	Do.
1	Rear cap.....	do.....	Do.
1	Gland.....	Screwed into rear cap.....	Bronze.
1	Cup packing.....	In rear cap.....	Leather.
1	Packing ring.....	do.....	Bronze.
2	Supporting bands.....	On cylinder.....	Steel.
2	Side straps.....	On supporting bands.....	Do.
1	Split keys for above.....	do.....	Do.
1	Pintle block.....	Bolted to platform.....	Cast iron
8	Pintle-block bolts.....	Block to platform.....	Steel.
1	Pintle.....	In pintle block.....	Do.
1	Pintle set screw.....	do.....	Do.
1	Pintle yoke.....	On pintle.....	Do.
2	Split keys for yoke.....	On yoke.....	Do.
1	Piston for buffer.....	In cylinder.....	Do.
1	Packing for piston.....	On piston.....	Bronze.
1	Piston spline screw.....	Piston to piston rod.....	Steel.
1	Piston rod.....	Fastened to piston.....	Do.
1	Piston-rod eye.....	End of piston rod.....	Do.
1	Obturator bar.....	Bolted inside cylinder.....	Do.
	Screw bolts for bar:		
1	Long.....	Bar to cylinder.....	Do.
3	Short.....	do.....	Do.
1	Countersunk head.....	do.....	Do.
4	Washers for screw bolts.....	do.....	Copper.
2	Filling and drain plugs.....	Screwed in cylinder.....	Steel.

a Pair.

List of parts, location, and material, with correct nomenclature—Continued.

Number.	Official name of part.	Location, etc.	Material.
	Elevating apparatus:		
1	Fork	Flasks to elevating screw	Steel.
2	Fork bolts	Fork to flasks	Do.
1	Fork bolt	Fork to elevating screw	Do.
2	Breech-strap eye washers	On fork bolt	Do.
1	Breech strap	In eye washers	Leather.
1	Inner screw	Inside outer screw	Steel.
1	Outer screw	Screws in crosshead	Do.
1	Crosshead	Journalled between flasks	Bronze.
2	Crosshead bearings	Bolted inside flasks	Do.
10	Bolts for above	Bearings to flasks	Steel.
1	Bevel gear	On crosshead	Bronze.
2	Bevel-gear keys	Gear to crosshead	Do.
2	Bevel-gear key screws	Keys to crosshead	Do.
1	Feather key to bevel gear	Gear to outer screw	Do.
1	Intermediate gear	On crosshead	Bronze.
1	Spur gear	On elevating rod	Do.
1	Spur-gear key	Gear to elevating shaft	Steel.
1	Elevating shaft	Through flasks	Do.
2	Elevating shaft bearings	Fastened to flasks	Bronze.
8	Screws for above	Bearings to flasks	Steel.
2	Elevating cranks	On shaft	Do.
2	Taper pins	Through crank and shaft	Do.

Price of carriage complete, \$3,000.

5-INCH SIEGE RIFLE CARRIAGE, MODEL 1896, AND MODEL 1896-M.

Total weight of carriage, 3,800 pounds.

Total weight of limber, 1,400 pounds.

List of parts, location, and material, with correct nomenclature.

Number.	Official name of part.	Location, etc.	Material.
	Parts of trail:		
a 1	Flasks	Form trail	Steel.
a 1	Brace plates	Riveted to flasks	Do.
1	Front transom	Riveted between flasks	Do.
1	Rear transom	do	Do.
1	Screw buffer	Riveted to transom	Wood.
1	Top plate	Riveted to top of flasks	Steel.
1	Bottom plate	Riveted to bottom of flasks	Do.
1	Firing-bracket plate	Riveted to top plate	Do.
1	Firing bracket	Riveted to bracket plate	Do.
1	Firing-bracket washer plate	do	Do.
1	Firing-bracket pin	Piston-rod eye to bracket	Do.
1	Hinge pin	Riveted to top plate	Do.
1	Reinforce plate	do	Do.
1	Bolster angle	Riveted to reinforce plate	Do.
1	Bolster	Riveted to bolster angle	Wood.
1	Rest	Riveted to front transom	Brass.
	Upper step:		
1	Step plate	Hinged to riser	Steel.
1	Riser	Hinged to hinge eyes	Do.
2	Hinge eyes	Riveted to reinforce plate	Do.
2	Hinge pins	Riser to step plate and eyes	Do.
1	Hinge pin	Step plate to hinge plate	Do.
1	Hinge-pin key	In hinge-pin eye	Do.
	Lower step:		
1	Step plate	Hinged to riser	Do.
1	Riser	Hinged to eyes	Do.
4	Hinge eyes	Riveted to top plate	Do.
2	Hinge pins	Riser to step plate and eyes	Do.
1	Hinge pin	Step plate to eyes	Do.
1	Hinge-pin key	In hinge-pin eye	Do.
2	Wheel guards	Riveted to flasks	Do.
1	Lunette plate	Riveted to bottom plate	Do.
1	Lunette-plate reinforce	Riveted to lunette plate	Do.
1	Lash-chain eye	do	Do.
1	Trail-shoe plate	Riveted to bottom plate and flasks	Do.
1	Maneuvering bracket	Riveted to shoe plate	Do.
1	Tool-box plate, upper	Riveted between flasks	Do.
1	Tool-box plate, lower	do	Do.

a Pair.

List of parts, location, and material, with correct nomenclature—Continued.

Number.	Official name of part.	Location, etc.	Material.
	Lower step—Continued.		
1	Tool-box housing	Riveted to top plate	Steel.
1	Pintle thimble	Riveted over pintle hole	Bronze.
1	Maneuvering bolt	Through trail	Steel.
2	Maneuvering rollers	Ends of bolt	Bronze.
1	Maneuvering-bolt nut	End of bolt	Steel.
1	Traveling trunnion brackets	Riveted to flasks	Bronze.
1	Trunnion beds	Bolted to flasks	Steel.
8	Trunnion-bed bolts	Beds to flasks	Do.
4	Cap-square eyebolts	Bolted to flasks	Do.
2	Cap squares	On trunnion beds	Do.
4	Cap-square bolt keys	In eyebolts	Do.
4	Bolt-key chains and eye studs	Studs screwed into flasks	Do.
1	Axle plate, upper	Between flasks and axle	Do.
1	Axle plate, lower	Riveted to upper plate	Do.
2	Axle blocking	Between axle plates	Do.
	Wheels and axle:		
1	Axle	do	Do.
1	Eye straps	Shrunk on ends of axle	Do.
2	Wheels	On axle spindles	Do.
2	Linchpins	Ends of spindles	Do.
2	Linchpin clamps	Riveted to linchpins	Do.
2	Linch washers	Between nave and linchpins	Do.
	Hydraulic buffer, etc.:		
1	Cylinder	Under carriage	Do.
1	Front cap	End of cylinder	Do.
1	Rear cap	do	Do.
1	Gland	Screwed into rear cap	Bronze.
1	Cup packing	In rear cap	Leather.
1	Packing ring	do	Bram.
2	Supporting bands	On cylinder	Steel.
2	Side straps	On supporting bands	Do.
4	Split keys for above	do	Do.
1	Pintle block	Bolted to platform	Cast iron.
8	Pintle-block bolts	Block to platform	Steel.
1	Pintle	In pintle block	Do.
1	Pintle set screw	do	Do.
1	Pintle yoke	On pintle	Do.
2	Split keys for yoke	On yoke	Do.
1	Piston for buffer	In cylinder	Do.
1	Packing for piston	On piston	Bronze.
1	Piston spline screw	Piston to piston rod	Steel.
1	Piston rod	Fastened to piston	Do.
1	Piston-rod eye	End of piston rod	Do.
1	Obturator bar	Bolted inside cylinder	Do.
	Screw bolts for bar—		
1	Long	Bar to cylinder	Do.
8	Short	do	Do.
1	Countersunk head	do	Do.
	Washers for screw bolts		
2	Filling and drain plugs	Screwed in cylinder	Copper.
1	Traveling-axle bracket	Bolted on axle	Steel.
4	Bolts for above	Bracket to axle	Bronze.
1	Yoke suspension bolt	Yoke to bracket	Steel.
1	Suspension-bolt pin	In bolt eye	Do.
1	Split key for above	In pin eye	Do.
	Elevating apparatus:		
1	Fork	Flasks to elevating screw	Do.
2	Fork bolts	Fork to flasks	Do.
1	Fork bolt	Fork to elevating screw	Do.
2	Breech-strap eye washers	On fork bolt	Do.
1	Breech strap	In eye washers	Leather.
1	Inner screw	Inside outer screw	Steel.
1	Outer screw	Screws in crosshead	Do.
1	Crosshead	Journalled between flasks	Bronze.
2	Crosshead bearings	Bolted inside flasks	Do.
10	Bolts for above	Bearings to flasks	Steel.
1	Bevel gear	On crosshead	Bronze.
4	Bevel-gear keys	Gear to crosshead	Steel.
4	Bevel-gear key screws	Keys to crosshead	Do.
1	Feather key to bevel gear	Gear to outer screw	Do.
1	Intermediate gear	On crosshead	Bronze.
1	Spur gear	On elevating rod	Do.
1	Spur-gear key	Gear to elevating shaft	Steel.
1	Elevating shaft	Through flasks	Do.
2	Elevating-shaft bearings	Fastened to flasks	Bronze.
8	Screws for above	Bearings to flasks	Steel.
2	Elevating cranks	On shaft	Do.
2	Taper pins	Through crank and shaft	Do.
	Road brakes:		
1	Handwheel sleeve bracket	Bolted to axle plate	Do.
4	Bolts for above	Bracket to plate	Do.
1	Handwheel sleeve	Between bracket and plate	Bronze.

* Pair.

List of parts, location, and material, with correct nomenclature—Continued.

Number.	Official name of part.	Location, etc.	Material.
	Road brakes—Continued.		
1	Oil plug for above.....	In sleeve oil hole.....	Brass.
1	Handwheel.....	Mounted in sleeve.....	Bronze.
1	Handwheel collar nut.....	Front of handwheel.....	Steel.
1	Collar-nut set screw.....	Collar to handwheel.....	Do.
1	Brake screw.....	Screws into handwheel.....	Do.
2	Brake truss.....	In slots in flasks.....	Do.
1	Brake stops.....	Riveted to truss.....	Do.
1	Brake-truss pin.....	Truss to screw.....	Do.
2	Brake springs.....	Between truss and shoes.....	Do.
4	Brake pins.....	Spring to truss and to shoes.....	Do.
2	Brake hinges.....	Riveted to flasks.....	Do.
4	Brake-hinge pins.....	Lever to hinges.....	Do.
4	Brake-lever eyes.....	Riveted to brake hinges.....	Do.
4	Brake-lever tubes.....	Support brake shoes.....	Do.
2	Brake shoes.....	End of brake levers.....	Bronze.
4	Wearing shoes.....	Bolted to brake shoes.....	Wood.
2	Wearing-shoe bolts.....	Brake shoe to wood shoe.....	Steel.
2	Brake-lever fastenings.....	Eyebolts on flasks.....	Do.
2	Keys and chains for above.....	Fastened to flasks.....	Do.
2	Brake-spring fastenings.....	Eyebolts on flasks.....	Do.
9	Split keys.....	For all pins.....	Do.
	Attachments for:		
2	Hammer staves, front.....	Riveted to flasks.....	Bronze.
2	Hammer staves, rear.....	do.....	Do.
1	Roller handspike, front.....	do.....	Steel.
1	Roller handspike, rear.....	do.....	Do.
1	Key and chain for above.....	Fastened to flask.....	Do.
1	Maneuvering handspike, front.....	do.....	Do.
1	Maneuvering handspike, rear.....	do.....	Do.
1	Key and chain for above.....	do.....	Do.
1	Name plate.....	Fastened to right flask.....	Bronze.

THE SIEGE LIMBER.

1	Middle rail (fork).....	Made of 2 steel angles.....
2	Under straps for middle rail.....	Fasten rail to axle.....
4	Bolts for under straps.....	Straps to rail.....
1	Front brace.....	Axle to front end of middle rail.....
4	Front-brace bolts.....	Brace to axle and rail.....
2	Axle straps.....	Fasten braces to axle.....
1	Pintle.....	Bolted to rear of middle rail.....
1	Pintle plate.....	On rail around pintle.....
2	Pintle-plate bolts.....	Plate to middle rail.....
2	Pintle braces.....	Axle to rear end of middle rail.....
2	Pintle bolts.....	Through rail, pintle, and pintle braces.....
1	Lashing-chain eyebolt.....	Screwed into bottom of pintle.....
1	Lashing chain and hook.....	Fastened to eyebolt.....
1	Traverse circle.....	On middle rail and axle.....
4	Traverse-circle bolts.....	Circle to pintle braces.....
1	Axle.....	Under middle rail.....
2	Wheels.....	On axle spindles.....
2	Linchpins.....	On spindles.....
2	Linchpin clasps.....	Pivoted to linchpin.....
2	Linch washers.....	Between pin and nave of wheel.....
2	Doubletree stay links.....	Doubletree to axle strap eyes.....
1	Doubletree.....	On doubletree bolt.....
1	Doubletree bolt.....	Front end of middle rail.....
1	Doubletree-bolt brace.....	Bolt to middle rail.....
2	Bolts for doubletree-bolt brace.....	Brace to middle rail.....
2	Singletrees.....	On doubletree hooks.....
1	Neck yoke.....	Front end of pole.....
1	Pole.....	Bolted to middle rail.....
2	Pole bolts.....	Pole to rail.....
1	Pole strap.....	Under pole at end of rail.....
1	Pole pad.....	End of pole.....
4	Pole-pad screws.....	Pad to pole.....
1	Neck-yoke stop.....	Riveted to pole.....
1	Copper sheathing.....	Around pole.....
1	Pole prop.....	Hinged under pole.....
	Consisting of—	
1	Hinge piece.....	Fastened to neck-yoke stop eye.....
1	Hinge pin.....	Through hinge piece.....
2	Legs.....	Pivoted to hinge piece.....
1	Pivot bolt.....	Legs to hinge piece.....
1	Eyebolt.....	Riveted to pole.....
1	Hook and chain.....	Fastened to pole.....

Price of carriage, complete, \$3,000.

Price of siege limber complete, \$603.98.

AMMUNITION WAGON.

The ammunition wagon is constructed to be available for use with either the 5-inch siege rifle, 7-inch howitzer battery, or 7-inch mortar battery.

The wagon box of ammunition wagon will hold 96 rounds of 5-inch rifle, 50 rounds of 7-inch howitzer, and 40 rounds of 7-inch mortar ammunition.

The ammunition boxes should be packed lengthwise with the box, so their handles can be reached from the rear.

Estimated weight of ammunition wagon, 2,500 pounds.

List of parts, location, material, and correct nomenclature.

Number.	Correct name of parts.	Location.	Material.
	Front running gear:		
2	Front wheels.....	On front axle.....	Archibald.
1	Front axle.....	Connects front wheels.....	Steel.
2	Linchpins.....	Through end of axles.....	Do.
2	Linchpin clasps.....	Riveted to linchpins.....	Do.
2	Linch washers (right and left).....	Between nave and linchpin.....	Do.
1	Hound.....	Above front axle and connects pole to gear.	Do.
2	Hound lateral brackets.....	Between hounds and axle.....	Do.
2	Hound braces (right and left).....	Connect front ends of hounds to axle.	Do.
2	Hound brace clips.....	Attach lateral hound brackets and hound braces to axle.	Do.
2	Hound side brackets (right and left).....	Connect hounds to axle.	Do.
2	Hound side bracket clips.....	Connect hound side brackets to axle.	Do.
2	Side bracket clip reinforce.....	On hound side brackets at axle.....	Do.
2	Side bracket blocking pieces (right and left).....	Between rear end side brackets and hounds.	Do.
1	Hound brace (upper).....	Between hounds.....	Do.
1	Hound brace (intermediate).....	do.....	Do.
1	Hound brace (lower).....	do.....	Do.
1	Holdback.....	Between kingbolt and doubletree bolt.	Do.
1	Holdback blocking piece.....	Between holdback and hound tie strap.	Do.
2	Holdback bolts.....	Attaches holdback to hound tie strap.	Do.
1	Hound tie strap.....	Across hounds.....	Do.
2	Hound blocking pieces.....	On ends of hound tie strap.....	Do.
1	Doubletree bolt and strap.....	Across end of hounds.....	Do.
1	Hound understrap.....	Below doubletree bolt and strap.....	Do.
1	Pole bolt.....	Through ends of hound and pole.....	Do.
1	Pole.....	Rear end between hounds.....	Wood.
1	Doubletree.....	Attached at front end of hounds.....	Steel.
2	Stay chains.....	Attached at axle and doubletree ends.	Do.
2	Singletrees.....	Attached to ends of doubletree.....	Do.
1	Neck yoke.....	On front end of pole.....	Wood.
1	Kingbolt.....	Through hound brace and end of reach.	Steel.
1	Lateral bracket, front bolster.....	Connected to hound braces by kingbolt.	Do.
1	Lateral bracket reinforce.....	Fastened to bottom of lateral brackets.	Do.
1	Fifth wheel.....	do.....	Do.
1	Reach loop strap.....	Fastened to top of lateral bracket.....	Do.
2	Front brackets, front bolster (right and left).....	Attached to fifth wheel and lateral bracket.	Do.
2	Rear brackets, front bolster (right and left).....	do.....	Do.
2	Bolsters (front and rear).....	Attached to front and rear brackets.	Do.
2	Bolsters (side).....	Attached to front and rear bolsters and brackets.	Do.
	Rear running gear:		
2	Rear wheels.....	On rear axle.....	Do.
1	Rear axle.....	Connects rear wheels.....	Do.
2	Linchpins.....	Through end of axles.....	Do.
2	Linchpin clasps.....	Riveted to linchpin.....	Do.
2	Linch washers (right and left).....	Between nave and linchpin.....	Do.
2	Hounds (right and left).....	Attached to axle and front ends connected.	Do.
2	Hound clips (right and left).....	Attaches hounds to axle.....	Do.
1	Hound tie strap.....	Connects front ends of hounds.....	Do.
1	Hound understrap.....	do.....	Do.
1	Reach.....	Connects front and rear gears.....	Do.
2	Reach blocking pieces.....	On bottom side of reach.....	Do.
1	Hound bolt.....	Through hound tie strap and reach.....	Do.
1	Wheel guard.....	Riveted to reach.....	Tool steel.

List of parts, location, material, and correct nomenclature—Continued.

Number.	Correct name of parts.	Location.	Material.
	Rear running gear—Continued.		
1	Lateral bracket (rear bolster).....	Over rear axle.....	Steel.
2	Lateral bracket clips.....	Attaches lateral bracket to axle.....	Do.
2	Side brackets (rear bolster).....	Attached to axle between hounds and wheels.	Do.
2	Side bracket clips.....	Attach side brackets to axle.....	Do.
2	Side bracket reinforce.....	Over axle.....	Do.
2	Bolsters (side).....	Over side brackets.....	Do.
2	Bolsters (front and rear).....	Attached to ends of side brackets.....	Do.
	Wagon box:		
5	Box straps.....	Around outside of box.....	Do.
3	Front end box rods.....	Through front end of box.....	Do.
2	Front tool-box reinforce.....	In front corner of front tool box.....	Do.
2	Front tool-box hinges.....	Riveted to lid and box.....	Do.
1	Front tool-box hasp.....	Riveted to tool-box lid.....	Do.
1	Front tool-box staple.....	In front end of box.....	Do.
16	Paulin securing eyes.....	On sides of box.....	Do.
4	Box reinforce.....	Riveted to bottom and side of box.....	Do.
3	Tie chains.....	Attached across top of box.....	Do.
3	Rear end hinges.....	Attached to bottom of box.....	Do.
2	Rear end end-fastening eyes (right and left).....	Attached on inside of box at upper corners.	Do.
2	Rear end end-fastening bolts.....	To fit eyes of rear end fastening.....	Do.
2	Rear end end-fastening bolt chains and staples.....	Attached to rear end.....	Do.
2	Rear end supporting chains.....	Attached to rear end and sides of box.....	Do.
1	Pair rear end chain-supporting pieces.....	Attached to rear end chain.....	Do.
1	Rear tool box.....	Attached to rear end bottom of box.....	Do.
4	Rear tool-box supporting rods.....	Attach tool box to bottom of box.....	Do.
3	Rear tool-box hinges.....	Riveted to tool box.....	Do.
1	Rear tool-box hasp.....	Attached to tool box.....	Do.
1	Rear tool-box turn-buckle pivot.....	Riveted to tool-box door.....	Bronze.
1	Rear tool-box turn-buckle.....	Riveted on turn-buckle pivot.....	Do.
1	Rear tool-box turn-buckle safe plate.....	Riveted to turn-buckle pivot.....	Steel.
10	Bolts (special) countersunk.....	Attach box to front and back running gear.	Do.
40	Washers for above bolts.....	On above bolts.....	Do.
1	Brake handle.....	Attached to side of box.....	Do.
1	Brake-handle pivot.....	do.....	Do.
1	Brake-handle socket.....	do.....	Do.
1	Brake reach rod.....	Connects brake handle with brake lever.	Do.
1	Brake lever.....	Attached to bottom of box.....	Do.
3	Brake bearings.....	Attach brake lever to box.....	Bronze.
2	Brake-shoe holders.....	On ends of brake lever.....	Do.
2	Brake shoes.....	Attached to ends of brake lever.....	Wood.

Price of ammunition wagon, complete, \$894.00.

Tool box for ammunition wagon.

There is supplied with each ammunition wagon—

One tool box (galvanized iron) containing—

Price each.

1	screw wrench, 12 inch.....
1	chisel hand, cold, $\frac{3}{4}$ inch.....
1	hand bastard file, 8 inch.....
1	hand hammer.....
1	steel punch.....
3	screw-driver bits, $\frac{1}{4}$ inch.....
3	screw-driver bits, $\frac{3}{8}$ inch.....
1	hatchet.....
1	claw-hammer.....
2	braces.....
2	nail pullers.....
1	axle-grease can (10 pound).....
1	axle-grease knife.....
1	lantern, railroad.....

SPARE PARTS FOR CARRIAGES.

The following spare parts for 5-inch siege carriage are issued and carried on one of the conveyances of siege train, to wit (estimated one year's supply):

Carriage (all expendable).

Price each.

10 throttling-bar screw bolts for hydraulic buffer	
6 filling and drain plugs for hydraulic buffer	
6 filling-plug screw bolts	
6 copper washers for throttling-bar screw bolts	
36 split keys, assorted	
1 pound wick packing for hydraulic buffer	

The following parts of carriage are also issued when needed for minor repairs:

	Price each.		Price each.
Hinge pins for steps		Road brake, complete—Continued.	
Hinge-pin keys		Parts of road brake—Continued.	
Pintle thimbles		Brake pins	
Cap square eyebolts		Brake hinges	
Bolt key chain		Brake hinge pins	
Bolt key chain eye studs		Brake-lever eyes	
Nave boxes		Brake-lever tubes	
Nave box flange bolts		Brake shoes	\$0.75
Nave box flange-bolt nuts		Wearing shoes	
Nave box assembling nut lock		Wearing-shoe bolts	
Nave box assembling nut-lock screw	\$1.98	Brake-lever fastenings	
Linchpins		Keys and chains for above	
Linch washers		Brake-spring fastenings	
Linchpin clamps		Split keys	
Breech-strap eye washers	1.30	Elevating device, complete	47.45
Breech straps	1.97	Fork	
Fork bolts	1.10	Fork bolts	
Inner elevating screw		Breech-strap eye washers	
Outer elevating screw		Breech straps	
Road brake, complete	185.87	Inner screw	
Parts of road brake—		Outer screw	
Handwheel sleeve bracket		Crosshead	
Bolts for above		Crosshead bearings	
Handwheel sleeve		Bolts for above	
Oil plug for above		Bevel gear	
Handwheel		Bevel-gear keys	
Handwheel collar nut		Bevel-gear key screws	
Collar-nut set screw		Feather key to bevel gear	
Brake screw		Intermediate gear	
Brake truss		Spur gear	
Brake stops		Spur-gear key	
Brake-truss pin		Elevating shaft bearings	
Brake springs		Wheels, complete	37.00

If a carriage should be materially damaged, authority should be applied for to turn it into Rock Island Arsenal.

The following spare parts are issued for ammunition wagon (estimated one year's supply):

Part.	Price each.	Part.	Price each.
1 pole	\$8.75	1 brake stake	
1 pole bolt		1 kingbolt	
2 brake shoes .....	.75	1 doubletree	\$7.50
1 brake spring		2 singletrees	4.37
1 brake latch			

SPARE PARTS FOR SIEGE LIMBER.

The following parts for siege limber are issued when needed for minor repairs:

	Price each.
Wheels, complete	\$37.00
Nave boxes—	
Nave-box flange bolts.....	
Nave-box flange-bolt nuts.....	
Nave-box assembling nut lock.....	
Nave-box assembling nut-lock screw.....	
Linch pins.....	1.98
Linch washers.....	
Linch-pin clasps.....	
Poles.....	8.75
Double trees.....	7.50
Neck yokes.....	7.65
Single trees.....	4.87
Pole props, complete ^a	7.58
Pole pads.....	1.25

^a For parts of pole props, see page 405.

If the limber frame be materially damaged, authority should be obtained to turn it into Rock Island Arsenal for repair.

In ordering spare parts, always give the model and number of carriage or ammunition wagon (shown on plate attached to both) for which parts are required.

PLATFORMS (SEMI-PERMANENT).

Two platforms have been provided for use with siege rifles, one for use in semi-permanent positions and the other for action and mobile field work.

The platform for semipermanent positions, weighing 6,200 pounds, is composed of:

Number.	Official name of part.	Dimensions.	Material.	Price each.
2	Sleepers.....	3 by 6 inches, 12 feet long.....	Yellow pine.....	
8	Sleepers.....	6 by 6 inches, 12 feet long.....	do.....	
24	Deck planks.....	3 by 6 inches, 14 feet long.....	Oak.....	
28	Deck planks.....	3 by 6 inches, 12 feet long.....	do.....	
192	Wood screws.....	$\frac{1}{2}$ inch diameter, 10 inches long.....	Steel, threaded up 5 inches.....	
48	Wood screws.....	$\frac{1}{2}$ inch diameter, 8.75 inches long.....	Steel, threaded up 3.5 inches.....	
36	Wood screws.....	$\frac{1}{2}$ inch diameter, 5.75 inches long.....	Steel, threaded up 3 inches.....	
1	Pintle-block plate.....	20 by 20 inches, $\frac{1}{2}$ inch thick.....	Steel.....	
8	Pintle block bolts.....	1 inch diameter, 9 inches long.....	do.....	
2	Wedges.....	8 inches wide, 38.5 inches long, 10 inches thick.....	Oak, shod with steel plate.....	
1	Screw-driver.....		For wood screws.....	
	Total.....			\$354.21

FIELD PLATFORM.

For field service there is furnished a platform and anchorage, weighing 1,060 pounds, and composed of the following parts:

Number.	Official name of part.	Dimensions.	Material.	Price each.
1	Trail rest.....	6 by 30 inches, 5 feet long.....	Oak planks.....	
2	Wheel rests.....	4 by 20 inches, 6 feet long.....	Yellow pine.....	
1	Cylinder rest.....	14 by 18 inches, $\frac{1}{2}$ inch thick.....	Steel plate.....	
2	Wheel wedges.....	8 by 9 inches, 50.5 inches long.....	Oak board, with steel plates.....	
1	Trail rest eye strap.....			
1	Trail rest chain.....			
1	Anchor rod beam.....	4 by 6 inches, 80 inches long.....	Oak.....	
1	Anchor rod clamp bolt.....			
1	Anchor rod clamp.....			
1	Anchor rod.....	$1\frac{1}{2}$ inch diameter, 11 feet long.....	Steel.....	
1	Anchor plate.....	24 inch diameter.....	$\frac{1}{2}$ inch steel plate.....	
	Total.....			\$87.00

NOTE.—When this platform is used with the 5-inch siege rifle carriage model, 1896, and the 7-inch siege howitzer carriage model, 1893, the straps on the hydraulic buffer must be lengthened $1\frac{1}{2}$ inches. If there are no facilities at the post for welding a piece to these straps, new straps of the proper length may be obtained on requisition.

IMPLEMENT WAGON.

The four field platforms composing the equipments of a battery will be transported from place to place on an ammunition wagon, which for the purpose will be utilized and be known as the implement wagon (no special implement having been constructed by the Ordnance Department), list of parts of which is given on page 406. In addition to these platforms, there will be carried on this wagon the following parts of the equipment of a siege battery:

	Price each.
1 pintle block, complete.....	\$10.78
50 canvas sand bags.....	
2 hydraulic jacks.....	
2 lifting jacks.....	
14 pieces of plank 3 by 12 inches by 8 feet (yellow pine).....	
1 saw, cross cut.....	
2 sledge hammers.....	
1 keg of spikes (100 pounds).....	
1 tripod complete.....	
1 Yale-Weston 2-ton triplex differential pulley.....	40.50
8 axes, handled.....	.76
8 pickaxes, handled.....	.64
8 spades, short handled.....	.90
8 shovels, long handled.....	.60
8 shovels, short handled.....	.20
4 tamps, iron.....	.30
5 gallons oil (hydrolene), for hydraulic cylinders.....	.12
5 gallons coal oil.....	.85
1 spirit level.....	5.96
2 watering buckets, leather.....	

^a Expendable.

For full and detailed description of these platforms, see "Handbook Material for 5-inch Siege Rifle Battery," issued by the Ordnance Department.

PLATFORM WAGON FOR SEMIPERMANENT PLATFORMS.

For the purpose of transporting the semipermanent platforms in active service there is used a platform wagon originally issued for use with siege batteries, but withdrawn from the service to be held in store for use in active service only.

SIEGE ARTILLERY PLATFORM WAGON.

The list of parts, material, location, etc., of this wagon is as follows:

Number.	Correct name of parts.	Location, etc.	Material.	Price each.
1	Front running gear.....			
1	Rear running gear.....			
1	Platform wagon.....			
	Front running gear, same as for ammunition wagon:			
1	Pintle carrier, front.....	Attached to hounds.....	Steel.....	
2	Pintle carriers, rear.....	Attached to axle.....	do.....	
2	Pintle-carrier clips.....	Attach rear pintle carrier to pole.....	do.....	
	Wagon platform:			
1	Front tool box.....	On front end of platform.....	Wood.....	
2	Front tool-box hinges.....	On top of tool box.....	Steel.....	
1	Front tool-box hasp and staple.....	On front of tool box.....	do.....	
1	Front-end reinforce.....	Across platform at front end.....	do.....	
2	Front-end braces.....	Attached to front end and platform sides.....	do.....	
4	Platform stays.....	Attached to ends of bolster.....	do.....	
2	Binder ropes.....	For stays.....	Manila.....	
2	Side tool boxes.....	Below platform and between running gear.....	Wood.....	
4	Side tool-box supporting straps.....	At front and back ends of tool box.....	do.....	
1	Brake lever, with wood stake.....	Attached to bottom of platform.....	do.....	
3	Brake bearings.....	Attach brake lever to platform.....	Bronze.....	
2	Brake-shoe holders.....	On ends of brake lever.....	do.....	
2	Brake shoes.....	Attached to ends of brake lever.....	Wood.....	
1	Rear tool box.....	Attached to bottom of platform at rear end.....	do.....	

Num-ber.	Correct name of parts.	Location, etc.	Material.	Price each.
2	Rear tool-box supporting straps.	Attach box to platform	Steel	
6	Tool-box hinges	Attach door to tool box	do	
4	Tool-box haps	Attached to platform	do	
4	Tool-box turnbuckles	Attached to tool-box door	do	
4	Tool-box turnbuckle pivots	Riveted to tool-box door	Bronze	
4	Tool-box turnbuckle plates	do	do	
40	Bolts (special), countersunk	Attach platform to front and back gear.	Steel	
40	Washers for above bolts .....	.....	.....

Price of artillery platform wagon, complete, \$227.18.

Provision is made in these wagons to carry in addition to the platform the tools and implements given on page 410, to go with wagon-carrying platforms.

When issued to the service the following spare parts are issued for this wagon, to wit:

	Price.
1 pole.....	\$3.75
1 pole bolt.....	
2 brake shoes .....	.75
1 king bolt.....	
1 doubletree.....	7.50
2 singletrees	4.57

COMBINED FORGE AND BATTERY WAGON.

The combined forge and battery wagon issued to siege batteries is the same as that used by light batteries.

For list of parts, nomenclature for same, etc., see page 484.

For list of tools, materials, etc., to be carried in same, see pages 446-448.

For price of combined forge and battery wagon, see page 471.

ARTILLERY STORE WAGON.

The artillery store wagon issued to siege batteries is the same as that used by light batteries.

For list of parts, nomenclature for same, etc., see page 488.

For list of tools, materials, etc., carried with same, see page 498.

For price of artillery store wagon see page 472.

SUBCALIBER TUBES.

Subcaliber tube fittings for .30-caliber rifle barrels are issued for use with 5-inch B. L. siege rifles, one to each gun. The list of parts of subcaliber fittings are:

	Price each.		Price each.
1 breech plate	\$21.88	1 recoil-arm nut	
1 breech-plate sleeve	20.00	1 recoil stirrup	
3 breech-plate screws		1 recoil-stirrup pin	
3 breech-plate screw washers		1 recoil-stirrup shoe	
1 muzzle sleeve	6.98	1 recoil-stirrup shoe pin	
1 muzzle rest		2 recoil-stirrup screws	
2 muzzle-rest screws		1 yoke	
2 muzzle-rest pins		1 yoke hinge	
1 muzzle spring		1 yoke-hinge pin	
1 muzzle-spring screw		1 yoke plate	
1 muzzle-spring pin		4 yoke-plate screws	
3 connecting rods		1 yoke-binding screw	
3 connecting-rod screws, front		1 binder	
3 connecting-rod screws, rear		1 lock screw	
2 recoil arms	3.00	1 butt-binding screw	
1 recoil-arm stand	1.50	1 butt-binding screw pin	
2 recoil-arm screws		1 wrench	\$0.75
1 recoil-arm bolt			

Price of subcaliber tube attachment, complete, \$62.98.

The following spare parts (one year's supply) for subcaliber tube and fittings are issued:

(All expendable in repairs.)

	Price each.		Price each.
1 bolt, model 1898.....	\$0.61	2 magazine springs.....	\$0.05
1 carrier, model 1898.....	.32	1 mainspring, model 1898.....	.02
1 cut-off, model 1898, complete.....	.12	1 safety lock, complete.....	.11
1 ejector.....	.06	1 sear.....	.06
1 ejector pin.....	.01	1 sear spring.....	.01
1 extractor, complete.....	.24	1 side plate, model 1898.....	.34
1 extractor pin.....	.01	1 side-plate screw.....	.01
1 extractor rivet.....	.01	1 sleeve.....	.28
1 extractor spring.....	.03	1 striker.....	.12
1 firing pin, assembled.....	.22	1 trigger.....	.07
1 follower.....	.15	1 trigger pin.....	.01
1 follower pin.....	.01	1 recoil-arm screw ^a.....	.32
1 gate, model 1898.....	.67	2 thumbcrews ^b.....	.13
1 hinge bar, complete.....	.11		

^a Issued with old pattern attachment with stock.

^b Issued with new pattern attachment without stock.

In ordering parts of attachments or spare parts model of attachment should be given.

The following tools and equipments are furnished with each gun and carriage:

	Price, each.
Attached to carriage:	
2 sections sponge and rammer staves, one 96 inches long, one 84 inches long.....	\$17.11
2 maneuvering handspikes.....	4.21
1 roller handspike.....	7.08
2 buckets, sponge, leather.....	5.86
1 lantern, railroad (in bucket).....	.80
On piece:	
1 breech cover.....	1.98
1 tompon and muzzle cover.....	2.91
Attached to piece:	
1 trunnion sight (front sight). (See page 324 for price.)	
1 trunnion-sight cover.....	.65
1 wrench for hydraulic buffer gland, in trail tool compartment.....	3.50
1 wrench, firing-bracket screw bolt, as convenient.....	2.75
In canvas roll in trail tool compartment:	
2 bar screwdrivers.....	.85
1 primer key.....	1.41
1 grease knife.....	5.00
1 obturator-nut wrench.....	.75
In same pocket—	2.50
2 bronze drifts.....	.75
1 cold chisel.....	1.25
1 pair cutting pliers.....	.50
In same pocket—	
1 screw wrench, 12-inch.....	.99
1 hammer, machinist, 16-ounce.....	1.00
In leather pouch in trail tool compartment:	2.50
1 file, flat, hand, dead smooth, 8-inch.....	.12
1 file, round, 1-inch, second cut.....	.06
1 file, half-round, smooth, 8-inch.....	.10
1 pin punch.....	.80
1 wrench for vent shield.....	.15
1 wrench for throttling bar screws.....	1.50
1 vent punch.....	2.00
1 gunner's reamer.....	1.25
1 gunner's gasket.....	1.35
1 priming wire.....	.90
1 extractor for stop in carrier ring.....	1.85
1 vaseline (cosmoline) brush (expendable).....	.10
1 fuse punch.....	3.40
On each ammunition wagon:	
1 linchpin.....	1.98
1 linch washer.....	5.15
2 fuse punches.....	3.40
6 fuse punch pins.....	.15
2 watering buckets, leather.....	5.95
1 tool box (for contents, see page 413).	

In armament chest, 5-inch B. L. rifle and carriage.

	Price, each.
Axle-grease can (1 gallon).....	\$1.50
Sperm-oil can ($\frac{1}{2}$ gallon).....	1.00
Vaseline (cosmic) can ($\frac{1}{2}$ gallon) ^a	1.25
Quadrant, model 1898, in quadrant box (see page 326 for price).....	
Telescopic sight, in leather case (see page 326 for price).....	
Rear sight, in leather case (see page 324 for price).....	
Oiler, brass ($\frac{1}{2}$ pint).....	.25
Shot tray.....	4.00
Fuse punch pins (6).....	.15
Mallet, wooden.....	.40
Emery cloth (1 quire), No. 00.....	.29
Rammer head, bronze.....	5.10
Loose in box:	
Guard nut, for rammer staff (on rammer head).....	.25
Sponge head for bore.....	3.02
Sponge head for chamber.....	4.28
Sponge covers (2), on sponges ^b.....	.25
1 sponge bore ^b.....	.71
1 sponge chamber ^b.....	.91
Wagon sponges (3) ^b.....	.59
Silk wipers (12) ^b.....	.21
Gunner's pouch.....	2.75
Lanyard, 30 feet.....	.84
1 tool chest (steel).....	\$5.50

^a To be superseded by light slushing oil.^b Expendable.

The size of armament chest is 21 inches long, 13.25 inches wide, and 9.5 inches deep. Weight of chest, 68 pounds; with contents, 113 pounds. It is carried on one of the wagons with siege train.

In making requisitions for separate sections of sponge and rammer staff, the length of section required should be clearly stated in the requisition.

DUMMY PROJECTILES.

Dummy projectiles and cartridges are issued to each siege battery for instructions and drill, the allowance being one projectile and cartridge to each gun.

HARNESSES.

The harness used with the 5-inch siege rifle batteries is the same as the service light-artillery harness for all purposes, including artillery store wagon, with the following modifications:

Three hundred and twenty pound mogul springs are substituted for the 200-pound springs on the wheel-harness trace chains, and 200-pound mogul springs on wheel-swing, lead-swing, and lead-team trace chains for gun carriage and ammunition wagons.

The lead harness is used for wheel-swing, lead-swing, and lead teams.

For detailed parts of artillery harness, see page 513.

For spare parts of artillery harness collars, etc., see page 515.

AMMUNITION.

The allowance of ammunition, service and subcaliber, for target practice and instruction is fixed annually and published in general orders. The allowance is for the fiscal year and not the calendar year, as heretofore. (See G. O., 99, A. G. O., 1903.)

The supply of ammunition to be kept on hand by a 5-inch B. L. rifle siege battery will be sufficient quantity to fill the ammunition wagons of the battery, and in addition a sufficient quantity to cover the needs for annual target practice.

7-INCH B. L. HOWITZER BATTERY.

For complete details as to care, instructions for operation, etc., see pamphlet issued by Ordnance Department, "Handbook of Material for 7-inch Siege Howitzer Battery."

The equipment of a 7-inch B. L. howitzer battery consists of four 7-inch B. L. howitzer carriages and limbers drawn by 8 horses; 4 ammunition wagons drawn by 8 horses; 1 implement wagon drawn by 8 horses; 1 forge and battery wagon drawn by 6 horses; and 1 artillery store wagon drawn by 4 horses. The harness required to equip the battery is 11 sets of wheel harness for 2 horses and 30 sets of lead harness for 2 horses and 41 harness sacks.

NOTE.—Three of the artillery ammunition wagons will be used as ammunition wagons and one as an implement wagon. The ammunition wagons will be replaced by eight caissons as soon as the latter have been designed and manufactured.

Six Army wagons, of standard pattern, each drawn by six mules, will be furnished by the Quartermaster's Department to each battery when needed on marches and in the field.

The mule harness is the regulation harness used by the Quartermaster's Department.

WEIGHT, DIMENSIONS, ETC., OF 7-INCH B. L. HOWITZER, MODEL 1890.

Weight, 3,710 pounds.
 Distance between rimbases, 18 inches.
 Length of trunnions, 4 inches.
 Distance of axis of trunnions from muzzle, 64.6 inches.
 Total length, 8.48 inches.
 Length of bore, 12.7 calibers.
 Maximum diameter of breech, 16.7 inches.
 Diameter of muzzle, 10 inches.
 Diameter of trunnion, 7 inches.
 Powder chamber:
 Diameter, 7.2 inches.
 Length, 7.465 inches.
 Capacity, 316.7 cubic inches.
 Travel of projectile in bore, — caliber, 81.385 inches.
 Projectile:

Kind.	C. I. shell.	Steel shell.	Shrapnel.
Weight, filled and fused pounds..	105	105	105
Ratio of weight to weight of piece	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$
Weight of bursting charge (rifle powder), pounds	8.6	a 4.3	1.9
Length calibers..	8	2.5	b 2
Sectional density	2.70	2.70	2.70
Price	b \$6.50	b \$10.50	b \$9.75

a Maximite or explosive D.

b Without fuse.

Powder:

Kind, sphero-hexagonal and smokeless.
 Weight, 10.5 pounds sphero-hexagonal, 3.5 pounds smokeless.
 Density of loading, 0.9177 sphero-hexagonal, 0.9059 smokeless.

Muzzle velocity:

Sphero-hexagonal, 1,100 feet per second.
 Smokeless, 1,100 feet per second.

Maximum pressure per square inch:

Sphero-hexagonal, 28,000 pounds.
 Smokeless, 20,000 pounds.

Muzzle energy:

Sphero-hexagonal, 881 foot-tons.

Smokeless, 881 foot-tons.

Rifling:

Number of grooves, 42.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, one turn in 25 calibers at — inches from muzzle, being uniform over the — inches.

POWDER NOTE.—See powder note 5-inch B. L. siege rifle, page 394.**7-INCH B. L. HOWITZER, MODEL 1890.**

The designation, "One 7-inch B. L. howitzer, model 1890," in correspondence invoice, receipts, requisitions, etc., comprises the gun proper with its attached parts and breech mechanism, complete, as per list below.

In filling a requisition for a gun of this model, it is customary to issue thereon the following articles, which are mentioned in the invoice: One rear sight (tangent), 1 rear-sight pouch, 1 front sight (tangent) with 4 screws, 1 front screw cover, 1 telescopic sight, with case. (Par. II, Ord. Order No. 41, *s.* 1885.)

List of parts in "one breech mechanism, complete," for 7-inch B. L. howitzer, model 1890.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One block carrier, complete:					
Hinge pin.....	1	Steel ...	Hinges block carrier to gun.	Interchangeable; all guns this model.	Carrier-ring hinge pin.
Hinge-pin screws...	2	....do ...	Secure hinge pin in block carrier.	....do .....	....do
Block carrier.....	1	....do ...	Encircle breechblock; hinged to jacket of piece.	....do	Carrier ring.
Block stop.....	1	....do ...	In block carrier between hinge lugs.	Requires careful fitting to individual block carrier.	Stop bolt; guide bolt.
Block-stop screw ...	1	....do ...	Screwed into block carrier and stop.	Interchangeable; all guns this model.	....do
Carrier-latch bolt...	1	Norway iron.	In latch recess in block carrier.	....do	Latch; latch pin.
Carrier-latch spring	1	Steel ...	Behind latch bolt in latch recess.	....do .....	....do
Carrier-latch cover.	1	....do ...	Carrier-latch recess in block carrier.	....do	Latch housing.
Carrier-latch screw.	2	....do ...	Secure latch cover to block carrier.	....do .....	....do
Vent cover; guide cover.	1	....do ...	Covers vent-guide slot in block carrier.	....do	Guide cover; guide-way cover.
Vent cover; guide-cover screw.	1	....do ...	In guide cover .....	....do .....	....do
One breechblock, complete:					
Breechblock	1	....do ...	In breech of gun; secured to block carrier by stop (and, when breech open, by latch bolt).	....do	Breech plug; breech screw.
Face plate.....	1	....do ...	Fastened to rear of breechblock.	....do .....	....do
Face-plate screws ..	2	....do ...	Fastened face plate to breechblock.	....do .....	....do
Block handles.....	2	....do ...	Riveted to face plate..	Not removable; fit all guns this model.	Handles.
Block levers.....	1	....do ...	In lugs on face plate, rear breechblock.	Interchangeable; all guns this model.	Lever; lever handle; rotating lever.

List of parts in "one breech mechanism, complete," for 7-inch B. L. howitzer, model, 1890—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One breech block, complete—Continued.					
Block-lever latch ..	1	Steel....	In slot in block lever..	Interchangeable; all guns this model.	Lever-handle latch.
Block-lever latch spring.	1	....do...	In slot in block lever, behind latch.	....do	
Block-lever latch pivot.	1	....do...	In block lever through block-lever latch.	....do	
Block-lever pivot ..	1	....do...	Through block lever and lugs on face plate.	....do	Lever-handle pin.
Block-lever screw ..	1	....do...	Through block lever into block-lever pivot.	Interchangeable; all guns this model. If removed, cannot be used again, account of fn.	Lever-handle screw; lever-handle set-screw.
Vent cover—					
Vent cover proper.	1	....do...	Piece of vent cover which projects over vent.	Interchangeable; all guns this model.	Vent cover.
Vent-cover bar ...	1	....do...	Piece of vent cover which connects with guide slot.	....do	Vent-cover lever.
Vent-cover nut...	1	....do...	Screwed on to inner end of vent-cover bar; holds on vent cover proper.	....do	Vent-cover lever nut.
Vent-cover stop screw.	1	....do...	Through face plate and vent-cover bar.	....do	Lever pin.
One obturator, complete:					
Obturator spindle, complete—					
Obturator spindle.	1	....do...	Through center bore of breechblock.	....do	Spindle; mushroom head and spindle. (The term "Obturator" should never be used for "Obturator spindle.")
Vent bushing	1	Copper..	In front end of obturator spindle.	Not removable. As issued, fits all guns this model.	
Obturator nut....	1	Steel ...	On rear end obturator spindle.	Spindle and nut not issued separately, account spline-screw seat; spindle and nut fit all guns this model.	
Obturator spline screw.	1	....do...	Halved into obturator spindle and nut.	Interchangeable; all guns this model.	Obturator-nut spline screw; spindle-nut spline screw.
Obturator spring ...	1	....do...	Between obturator nut and shoulder in breechblock.	....do	
Front split ring	1	....do...	Between head of obturator spindle and gas-check pad.	....do	
Rear split ring	1	....do...	Between filling-in disk and gas-check pad.	....do	
Small split ring	1	....do...	Between filling-in disk.	....do	Spindle split ring.
Gas-check pad	1	Tallow and asbestos in canvas.	Between front and rear split rings on spindle.	....do	
Filling-in disk	1	Steel....	In front of breechblock on obturator spindle.	....do	Gas-check pad.

List of parts in "one breech mechanism, complete," for 7-inch B. L. howitzer, model, 1890—Continued.

PARTS ATTACHED TO GUN PROPER, BUT REMOVABLE.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Retracting stud	1	Steel....	In recess at breech for block-carrier (screwed in R. H.) thread.	Interchangeable; all guns this model.	Conical stud; operating stud, latch stud.
Rear-sight base.....	1	Bronze .	In vertical hole, breech of gun.	Fitted to individual gun to adjust sights.	
Front-sight base.....	1	....do ...	Screwed on right rim base.	....do
Rear-sight base set screw.	1	Steel....	In breech of gun, end engaged in rear-sight base.	Interchangeable; all guns this model.	
Front-sight base screw.	4	....do ...	Through front-sight base into rim base.	....do
Telescopic sight bracket.	1	Bronze .	On right trunnion.....	Not interchangeable.	
Telescopic sight bracket screws.		Steel....	In telescopic sight bracket.	(a)	
Lifting eyebolt.....	1do ...	Screwed into top of trunnion hoop.	Interchangeable; all 8-inch siege guns and 7-inch howitzers that are drilled for eyebolt.	

^a Two forms of sight bracket have been made. The old has 3 screws to secure it to trunnion. The new has dovetailed slot and 1 screw. The screws are of different dimensions for the two forms of bracket. All guns will be altered to fit them for the new form as soon as practicable. Requisitions should state which brackets and screws wanted.

Price of howitzer, complete, \$2,733.

WEIGHTS, DIMENSIONS, ETC., 7-INCH B. L. HOWITZER, MODEL 1890.

Weight, 3,650 pounds.

Distance between rimbases, 18 inches.

Length of trunnions, 4.25 inches.

Distance of axis of trunnions from muzzle, 64.2 inches.

Total length, 8.27 feet.

Length of bore, 12.7 calibers.

Maximum diameter of breech, 16.6 inches.

Diameter of muzzle, 10 inches.

Diameter of trunnions, 7 inches.

Powder chamber:

Diameter, 7.2 inches.

Length, 7.465 inches.

Capacity, 316.7 cubic inches.

Travel of projectile in bore,— caliber, 81.385 inches.

Projectile:

Kind.	C. I. shell.	C. S. shell.	Shrapnel.
Weight (filled and fused).....pounds..	105	105	105
Ratio of weight to weight of piece.....	^a	^a	^a
Weight of bursting charge (rifle powder)			
.....pounds..	8.6	^a 4.3	1.9
Length.....calibers..	8	2.5	^b 2
Sectional density.....	2.70	2.70	2.70
For prices see page —.			

^a Maximite or explosive II.

^b Without fuse.

Powder:

Kind, sphero-hexagonal and smokeless.

Weight, 10.5 pounds sphero-hexagonal; 3.5 pounds smokeless.

Density of loading, 0.9177 sphero-hexagonal; 0.9059 smokeless.

Muzzle velocity:

Sphero-hexagonal, 1,100 feet per second.

Smokeless, 1,100 feet per second.

Maximum pressure per square inch:

Sphero-hexagonal, 28,000 pounds.

Smokeless, 20,000 pounds.

Muzzle energy:

Sphero-hexagonal, 881 foot-tons.

Smokeless, 881 foot-tons.

Rifling:

Number of grooves, 42.

Width of grooves, 0.3736 inch.

Depth of grooves, 0.06 inch.

Width of lands, 0.15 inch.

Twist of rifling, one turn in 50 calibers at origin, one turn in 25 calibers at — inches from muzzle, being uniform over the — inches.

POWDER NOTE.—See powder note 5-inch B. L. rifle (siege), page 394.

7-INCH B. L. HOWITZER, MODEL 1898.

The designation "One 7-inch B. L. howitzer, model 1898," in correspondence, invoice, receipts, requisitions, etc., comprises the gun proper with its attached parts and breech mechanism complete, as per list below.

In filling a requisition for a gun of this model it is customary to issue thereon the following articles, which are mentioned in the invoice: One rear sight (tangent), one front sight (tangent) (with four screws), and one telescopic sight (with case). (Par. II, Ordnance Order No. 41, s. 1885.)

List of parts in "One breech mechanism, complete," for 7-inch B. L. howitzer, model 1898.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One block carrier, complete:					
Hinge pin	1	Steel....	Hinge-block carrier to gun.	Interchangeable all guns this model.	Block-carrier hinge pin.
Block carrier	1	....do...	Supports breechblock, hinged to gun.	....do	
Spindle key	1	....do...	Screwed to block carrier. Extends through breechblock into obturator spindle.	....do	
Spindle-key screw ..	1	....do...	Fastens spindle key to block carrier.	....do	
Carrier-latch bolt....	1	....do...	In block carrier. Latches block carrier to gun and serves as stop for breechblock.	....do	Latch bolt.
Carrier-latch lever..	1	....do...	In block carrier. Engages in carrier-latch bolt.	....do	Latch lever.
Carrier-latch pivot..	1	....do...	In block carrier and through carrier-latch lever.	....do	Latch - lever pivot.
Carrier-latch spring	1	....do...	In block carrier and behind carrier-latch lever.	....do	Latch spring.

List of parts in "One breech mechanism, complete," for 7-inch B. L. howitzer, model 1898—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One block carrier, complete—Contd.					
Operating lever	1	Steel....	Pivoted to lug, lower part block carrier.	Interchangeable all guns this model.	Lever.
Operating pinion....	1do....	On operating-pinion pivot.do....	Pinion.
Operating-pinion pivot.	1do....	Screwed into lug, lower part block carrier.do....	Pivot.
Operating-pinion pivot nut.	1do....	On lower end operating-pinion pivot.do....	Pivot nut.
One breechblock, complete:					
Breechblock.....	1do....	In breech recess....do....	
Gear segment.....	1	Bronze..	Attached to rear end breechblock.do....	Segment and rack.
Gear-segment screws.	2	Steel....	Secure gear segment to breechblock.do....	
Firing-attachment operating pin.	1do....	On upper side gear segment.do....	
Firing-attachment operating-pin screw.	1do....do....do....	
Breechblock oil-hole screw.					
One obturator, complete:					
Obturator spindle, complete—					
Obturator spindle	1do....	In center bore of breechblock.do....	
Vent bushing.....	1	Copper..	In front end obturator spindle.	Interchangeable all guns this model. Driven in and riveted.	
Obturator nut....	1	Steel....	On obturator spindle near rear end.	Interchangeable all guns this model.	
Obturator lock nut.	1do....	On obturator spindle in rear of obturator nut.do....	
Firing attachment, complete.					
Slide housing.....	1	Steel...	Attached to rear end of spindle.	Interchangeable ...	Housing.
Ejector slot.....			Cut in slide housing....do....	
Slide-housing firing groove.		do....do....	
Slide-housing guides.		Steel....do....do....	
Slide-housing spline screw.	1do....	Secures housing to spindle.	Interchangeable ...	
Slide stop.....	1do....	Screwed into right side of slide housing.do....	Stop screw.
Slide.....	1do....	Slides in slide-housing guides.do....	
Slide handle.....	1do....	Screwed into top of slide.	Not interchangeable.	
Ejector.....	1do....	Seated in rear face of housing.	Interchangeable ...	Primer ejector.
Ejector roller....	1do....	Lies in slot in slide.do....	Loose-pin roller.
Ejector-roller shutter.	1do....	Retains roller in slide.do....	Roller shutter.
Ejector-roller-shutter screw.	1do....	Pivots shutter to slide.do....	Roller-shutter screw.
Firing leaf.....	1do....	Pivoted to slide....do....	
Firing-leaf safety pin.			Formed on firing leaf.do....	Safety lug.
Firing-leaf spring.	1	Steel...	On top of slide....	Interchangeable ...	Leaf spring.
Firing-leaf pivot.	1do....	Pivots leaf to slide....do....	
Front split ring....	1do....	Between head of obturator spindle and gas-check pad.do....	Exterior split ring, front.
Rear split ring.....	1do....	Between filling-in disk and gas-check pad.do....	Exterior split ring, rear.
Small split ring....	1do....	On obturator spindle in rear of gas-check pad.do....	Interior split ring.

List of parts in "One breech mechanism, complete," for 7-inch B. L. howitzer, model 1898—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One obturator, complete—Continued.					
Gas-check pad.....	1	Tallow and asbestos in canvas.	On obturator spindle between split rings.	Interchangeable ...	Pad.
Filling-in disk.....	1	Steel.....	On obturator spindle in front of breech-block.	.....do.....	
Obturator ball-bearing washer (one per gun)—					
Cups.....	2	.....do.....	(On obturator spindle forward of obturator nut and in rear of interior shoulder in breechblock.	Interchangeable all guns this model. Washers issued as a whole only.	Washer rings. Washer clamps.
Connector.....	1	Copper.			
Balls.....	20	Steel.....			

PARTS ATTACHED TO GUN PROPER, BUT REMOVABLE.

Carrier-latch cam bolt	1	Steel....	On breech face of gun, left side.	Not interchangeable. Requires fitting.	Tripping stud.
Carrier-latch seat bolt	1do.....do.....do.....	Latch-bolt seat.
Rear-sight base.....	1	Bronze.....	.....do.....	.....do.....
Rear-sight base screw	1	Steel.....	.....do.....	Interchangeable all 7-inch howitzers.
Front-sight base.....	1	Bronze.....	On left rim base.....	Not interchangeable	Interchangeable all 7-inch howitzers, model 1898.
Front-sight base screws	4	Steel.....	.....do.....	Interchangeable all 7-inch howitzers.
Telescopic sight bracket.	1	Bronze.....	On right trunnion.....	Interchangeable ...	
Telescopic sight-bracket screws.	1	Steel.....do.....	Interchangeable all 7-inch howitzers, model 1898.	Interchangeable all 7-inch howitzers, model 1898, drilled for eye-bolts.
Lifting eyebolt.....	1	.....do.....	On top of trunnion hoop.	Interchangeable

Price of howitzer complete, \$1,943.

NOTE.—The hinge pin of the breech mechanism of these guns are in the future to be provided with oil groove and screw.

SPARE PARTS OF GUN.

The following spare parts are issued for 7-inch B. L. howitzer and carried in one of the available compartments of the forge and battery wagon, artillery store wagon, or other army conveyance with siege train. They are as follows (estimated one year's supply, all expendable):

Part.	Price each.
4 obturator springs.....	\$3.50
6 carrier latch bolts.....	2.00
12 carrier latch springs.....	.50
4 gas-check pads.....	4.50
2 front split rings.....	8.50
2 rear split rings.....	8.50
2 small split rings.....	4.00
6 vent bushings, copper.....	.....
4 hinge pin oil hole screws.....	.52
4 breech block oil hole screws.....	.52

The following spare parts for breech mechanisms of 7-inch B. L. howitzers are kept on hand at arsenals, and will be issued from time to time as required:

7-inch B. L. howitzer, model 1890.

Part.	Price each.
Hinge pins	\$4.50
Hinge-pin screws.....	.50
Block-stops.....	.50
Block-stop screws.....	4.00
Carrier latch covers.....	.50
Carrier latch screws.....	4.50
Vent covers	1.00
Vent-cover bar.....	8.00
Vent-cover stop screw.....	2.00
Vent-cover nut.....	4.00
Block lever pivot.....	.50
Block lever screws.....	5.50
Block lever latch.....	.25
Obturator spline screw.....	5.00
Obturator nut.....	.50
Retracting studs.....	1.50

7-inch B. L. howitzer, model 1893.

Part.	Price each.
Obturator nut.....	\$4.50
Obturator ball-bearing washer.....	16.00
Obturator spline screw.....	.86
Hinge pin	4.50
Carrier latch seat bolt.....	13.00
Carrier latch seat bolt screw.....	1.90
Carrier latch cam bolt.....	11.50
Carrier latch cam bolt screw.....	1.30
Firing attachment complete.....	80.00
Firing leaf spring.....	3.25
Ejector (firing attachment).....	9.00

In ordering spare parts always give the name of maker, model, and number of gun for which parts are required. All spare parts, unserviceable, when replaced, should be turned in to Watervliet Arsenal.

SIGHTS FOR 7-INCH B. L. HOWITZER.

See "Handbook of Sights for Cannon, 1899," issued by the Ordnance Department.

FRONT SIGHT.

The front sight is attached by four screws to the right rim base of the gun over the axis of the trunnions, its component parts are as follows:

Part.	Price each.
Sighting leaf	
Sighting-leaf clamp screw.....	
Base.....	
Total	\$12.50

TANGENT (REAR) SIGHT (MODEL 1895).

The tangent sight, model 1895, is a combined front and rear sight, the change from front to rear sight being accomplished by interchanging sighting leaves. In changing to front sight, for the purpose of sighting to the rear, the front (trunnion) sight becomes a rear sight.

The sight is composed of the following principal parts:

Official name of part.	Material.	Price each.
Vertical limb	Steel .....	.....
Base	Bronze .....	.....
Collar	do .....	.....
Deflection bar	Aluminum bronze .....	.....
Clamping screw for vertical limb	Steel .....	.....
Vernier gib for deflection bar	do .....	.....
Vernier gib for vertical limb	do .....	.....
Thumbcrew for tangent-sight leaf	do .....	.....
Thumbcrew for trunnion-sight leaf	do .....	.....
Head	Bronze .....	.....
Thumbcrew for deflection bar	Steel .....	.....
Set screw	do .....	.....
Stop screw	do .....	.....
Two sighting leaves	do .....	.....
Trunnion sight base	Bronze .....	.....
Total		\$40.50

TELESCOPIC SIGHTS.

Telescopic sights are also issued with the howitzers, one for each howitzer, with necessary sight brackets.

For full description and instructions for their use see "Handbook of Telescopic Sights," issued by Ordnance Department.

AZIMUTH INSTRUMENTS.

Azimuth instruments, complete, with tripod and pier mount and case, are issued to siege batteries as part of the regular equipment, two to each battery. For full description see pamphlet, "Description of Azimuth Instruments," Model 1900, issued by Ordnance Department.

RANGE FINDERS.

Two Weldon range finders are issued to each battery of 7-inch howitzers as part of its regular equipment.

GUNNERS' QUADRANTS.

One gunner's quadrant is issued with each B. L. howitzer.

For list of parts, see page 325.

For full description, etc., see "Handbook of Sights for Cannon, 1899," issued by Ordnance Department.

STOP WATCHES.

Stop watches (time interval recorders) are issued to siege batteries on the basis of three per battery.

SOUND TELEMETERS.

Sound telemeters are issued to siege batteries on basis of two per battery.

FUSES.

Fuses used for 7-inch B. L. howitzer are:

For shell, high-resistance base fuse A.

For detonating shell, high-resistance base fuse C. For prices see pages 345-347, 349-350.

For shrapnel, high-resistance, 28-second combination fuse. For prices see page 347.

For list of component parts of fuses, see page 345-350.

PRIMERS.

The following primers are used with 7-inch B. L. howitzer:

Obturator friction primers (with screw thread for old model vents). For prices see page 352.

Obturator friction primers, for siege cannon (model 1902). For prices see page 352.

Obturator electric primers (single wire screw thread). For prices see page 352.

For full description of fuses, see pamphlet, "Fuses for Field, Siege, and Seacoast Powder-Charged Shell and Shrapnel," issued by Ordnance Department.

For list of spare parts of howitzer, see page 420 and 421.

For allowance of materials, supplies, etc., see page 446-450.

The ammunition for the 7-inch B. L. howitzer is packed for shipment and storage in wooden cases, with handles at each end, one complete round in each, shell or shrapnel, filled and fused, powder charges in hermetically sealed cases, and three obturating primers.

7-INCH B. L. HOWITZER CARRIAGE, MODEL 1893.

Weight of carriage, 3,960 pounds.

Weight of limber, 1,400 pounds.

Axle of trunnions above platform, 72 inches.

Distance between points of support at wheels and at trail, 100 inches.

List of parts, location, and material, with correct nomenclature.

Num- ber.	Official name of part.	Location.	Material.
	Parts of trail:		
a1	Flasks.....	Form trail.....	Steel.
a1	Front transom.....	Riveted between flasks.....	Do.
2	Strap eyes.....	Bolted to front transom.....	Do.
2	Bolts for strap eyes.....	Strap eyes to transom.....	Do.
1	Strap.....	In strap eyes.....	Lather.
1	Middle transom.....	Riveted between flasks.....	Steel.
1	Double transom, front plate.....	Riveted to rear plate and flasks.....	Do.
1	Double transom, rear plate.....	Riveted to front plate and flasks.....	Do.
1	Piston-rod loop.....	Front of double transom.....	Do.
1	Piston-rod loop plate.....	On rear of double transom.....	Do.
2	Step angles.....	Riveted to flasks.....	Do.
1	Step spring.....	do.....	Do.
1	Step.....	Hinged to angles.....	Do.
2	Step hinges.....	Step to angles.....	Do.
2	Step springs.....	Riveted to step.....	Do.
1	Rear transom.....	Riveted between flasks.....	Do.
2	Tool-box seat angles.....	Riveted to transom.....	Do.
1	Tool-box stop plate.....	Across front of angles.....	Do.
1	Tool-box securing pin.....	Through rear end of angles.....	Do.
1	Key and chain.....	On end of angles.....	Do.
1	Maneuvering bolt and nut.....	Through end of trail.....	Do.
2	Maneuvering rollers.....	On maneuvering bolt.....	Bronze.
1	Trail shoe plate.....	Connects rear ends of flasks.....	Steel.
1	Maneuvering bracket.....	Riveted to shoe plate.....	Do.
a1	Lunette plate.....	Riveted to flasks.....	Do.
a1	Main assembling axle bracket.....	Between flasks and axle.....	Do.
a1	Outside assembling axle bracket.....	On axle outside flasks.....	Do.
2	Assembling axle-bracket washer.....	On outside bracket.....	Do.
4	Axle straps.....	Fasten brackets to axle.....	Do.
	Wheels and axle:		
1	Axle.....	Under flasks.....	Do.
2	Wheels.....	On axle spindles.....	Do.
2	Linchpins.....	Ends of spindles.....	Do.
2	Linchpin clasp.....	Riveted on linchpin.....	Do.
2	Linch washers.....	Between nave and linchpin.....	Do.
	Trunnion carriages, etc.:		
a1	Slide rails.....	Top of flasks.....	Do.
a1	Trunnion beds.....	On slide rails.....	Cast steel.
a1	Trunnion cap-squares.....	On beds.....	Do.
4	Cap-square bolts, short.....	Cap-squares to beds.....	Steel.
4	Cap-square bolts, long.....	do.....	Do.
2	Cap-square oil-hole stopper.....	In cap-square oil hole.....	Brass.

a Pair.

List of parts, location, and material, with correct nomenclature—Continued.

Number.	Official name of part.	Location.	Material.
	Trunnion carriage, etc.—Continued.		
a1	Recoil cylinders.....	On end of slide rails.....	Steel.
8	Bolts for recoil cylinders.....	Cylinders to slide rails.....	Do.
4	Screw bolts for recoil cylinders.....	Under rear of cylinders.....	Do.
2	Front caps for recoil cylinders.....	Front end of cylinders.....	Do.
2	Rear caps for recoil cylinders.....	Rear end of cylinders.....	Do.
2	Pistons for recoil cylinders.....	In cylinders.....	Do.
4	Packing for recoil-cylinder pistons.....	On piston head.....	Bronze.
16	Screws for packing.....	Packing to piston head.....	Steel.
2	Piston-rod jam nut.....	On piston rod.....	Do.
4	Throttling bar for recoil cylinder.....	Bolted inside cylinders.....	Do.
	Throttling-bar screw bolts:		
4	Long.....	Throttling bar to cylinder.....	Do.
4	Medium.....	do.....	Do.
4	Short.....	do.....	Do.
4	Filling and emptying plugs.....	In cylinders.....	Do.
2	Counter-recoil stops.....	On slide rails.....	Do.
4	Screws for counter-recoil stops.....	Stops to rails.....	Do.
8	Outer recoil springs.....	Rear of trunnions.....	Do.
8	Inner recoil springs.....	do.....	Do.
6	Spring separators.....	Between springs.....	Do.
2	Spring centers, front.....	In spring column.....	Bronze.
2	Spring centers, rear.....	do.....	Do.
2	Compression bolts.....	Connect centers.....	Steel.
2	Recoil-attachment adjusting screws.....	Trunnion bed to spring column.....	Do.
a1	Traveling trunnions.....	Riveted to flasks.....	Bronze.
	Elevating apparatus:		
1	Elevating rod.....	On brackets on right flask.....	Steel.
1	Rear bracket for elevating rod.....	Bolted to flask.....	Bronze.
2	Bolts for rear bracket.....	Bracket to flask.....	Steel.
1	Front bracket for elevating rod.....	Bolted to flask.....	Do.
2	Screw bolts.....	Bracket to flask.....	Do.
1	Elevating-rod nut.....	Rear end of rod.....	Do.
2	Nuts.....	Front end of shaft.....	Do.
1	Worm.....	do.....	Do.
1	Ball bearing, small.....	Assembled on worm.....	Do.
2	Bearing rings.....	For balls.....	Do.
26	Hardened balls.....	$\frac{1}{4}$ inch diameter.....	Do.
1	Ring cover.....	Holds bearings together.....	Copper.
1	Ball bearing, large.....	Assembled on worm.....	Do.
2	Bearing rings.....	For balls.....	Steel.
26	Hardened balls.....	$\frac{1}{4}$ inch diameter.....	Do.
1	Ring cover.....	Outside grooved bearings.....	Bronze.
8	Screws.....	Bronze ring to bearings.....	Steel.
9	Worm-buffer washers.....	On worm.....	Bronze.
9	Worm-buffer washers.....	do.....	Leather.
2	Collar nuts.....	Screw on end of worm.....	Steel.
	Hydraulic buffer, etc.:		
1	Cylinder.....	Under carriage.....	Do.
1	Front cap.....	End of cylinder.....	Do.
1	Rear cap.....	do.....	Do.
1	Gland.....	Screwed into rear cap.....	Bronze.
1	Gland washer.....	In rear cap.....	Do.
2	Supporting bands.....	On cylinder.....	Steel.
2	Side straps.....	On supporting bands.....	Do.
4	Split keys for supporting bands.....	On supporting bands.....	Do.
1	Pintle block.....	Bolted to platform.....	Cast iron.
6	Pintle-block bolts.....	Block to platform.....	Steel.
1	Pintle.....	In pintle block.....	Do.
1	Pintle set screw.....	do.....	Do.
2	Pintle yoke.....	On pintle.....	Do.
2	Split keys for yoke.....	On yoke.....	Do.
1	Piston for buffer.....	In cylinder.....	Do.
1	Packing for piston.....	On piston head.....	Bronze.
7	Screws for packing.....	Packing to piston.....	Steel.
1	Piston-rod eye.....	End of piston rod.....	Do.
1	Throttling bar.....	Bolted inside cylinder.....	Do.
	Screw bolts for bar:		
1	Long.....	Bar to cylinder.....	Do.
1	Short.....	do.....	Do.
2	Countersunk heads.....	do.....	Do.
4	Washers for screw bolts.....	Screwed in cylinder.....	Copper.
2	Filling and drain plugs.....	On axle.....	Steel.
1	Traveling-bracket cap.....	On axle.....	Do.
2	Traveling-bracket understraps.....	Cap to understraps.....	Do.
4	Bolts and nuts.....	In understrap eyes.....	Do.
1	Bracket pin.....	do.....	Do.
1	Split key for bracket pin.....	In pin eye.....	Do.
	Road brake:		
1	Brake plate.....	Between flasks over axle.....	Do.
1	Handwheel sleeve bracket.....	Bolted to brake plate.....	Do.
4	Bolts for handwheel sleeve bracket.....	Bracket to plate.....	Do.

* Pair.

List of parts, location, and material, with correct nomenclature—Continued.

Number.	Official name of part.	Location.	Material.
	Road brakes—Continued.		
1	Handwheel sleeve	Between bracket and plate	Bronze.
1	Oil plug for handwheel sleeve	In sleeve oil hole	Brass.
1	Handwheel	Mounted in sleeve	Bronze.
1	Handwheel collar nut	Front of handwheel	Steel.
1	Collar-nut set screws	Collar to handwheel	Do.
1	Brake screw	Screws into handwheel	Do.
1	Brake truss	In slots in flask	Do.
2	Brake stops	Riveted to truss	Do.
1	Brake-truss pin	Truss to screw	Do.
2	Brake springs	Between truss and shoes	Do.
4	Brake pins	Spring to truss and to shoes	Do.
2	Brake hinges	Riveted to flasks	Do.
4	Brake-hinge pins	Lever to hinges	Do.
4	Brake-lever eyes	Pinned to brake hinges	Do.
4	Brake-lever tubes	Support brake shoes	Do.
2	Brake shoes	End of brake levers	Bronze.
2	Wearing shoes	Bolted to brake shoes	Wood.
4	Wearing-shoe bolts	Brake shoe to wood shoe	Steel.
2	Brake-lever fastening	Eyebolts on flasks	Do.
2	Key and chain for brake lever	Fastened in flasks	Do.
2	Brake-spring fastening	Eyebolts on flasks	Do.
9	Split keys	For all pins	Do.
	Attachments for:		
2	Rammer staves, front	Riveted to flasks	Bronze.
2	Rammer staves, rear	do	Do.
1	Roller handspike, front	do	Steel.
1	Roller handspike, rear	do	Do.
1	Maneuvering handspikes, front	do	Do.
1	Maneuvering handspikes, rear	do	Do.
1	Handspike-attachment plate	Riveted between flasks	Do.

Price of carriage, complete, \$3,000.

7-INCH B. L. HOWITZER CARRIAGE, MODEL 1899.

Howitzers of model 1898 are habitually mounted on these carriages.

Weight of carriage, 2,900 pounds.

Weight of limber, 1,400 pounds.

Axis of trunnion above platform, 80 inches.

Distance between points of support at wheels and at trail, 100 inches.

List of parts, location and material, with correct nomenclature.

Number.	Name of part.	Location.	Material.
	Parts of trail:		
1	Flasks	Form trail	Steel.
1	Flask stiffeners	Riveted to flask	Do.
1	Front transom	Connects front of flasks	Do.
2	Snap hooks	Riveted to front transom	Do.
2	Handspike and rammer sockets	do	Bronze.
1	Stop transom	Bolted between flasks	Steel.
4	Stop-transom bolts	Transom to flasks	Do.
1	Carriage-brake transom	Riveted between flasks	Do.
1	Reinforce plate	On brake transom	Do.
1	Carriage-brake fastener	Bolted to brake transom	Do.
6	Bolts for brake fastener	Fastened to transom	Do.
1	Footplate	Between flasks	Do.
2	Pivots for tool-box lock	Riveted on footplate	Do.
2	Levers for tool-box lock	On pivot	Do.
1	Split key and chain for tool-box lock	Fastened to footplate	Do.
1	Trail-shoe plate	End of trail	Do.
2	Lunette reinforce	Riveted on shoe plate	Do.
1	Maneuvering shaft	Through trail	Do.
2	Nuts	Ends of shaft	Do.
2	Maneuvering-shaft brackets	Riveted to flasks	Bronze.
2	Maneuvering rollers	On shaft	Do.
1	Axle brackets	Between flasks and axle	Cast steel.
2	Axle-bracket caps	To brackets under axle	Do.
8	Bracket bolts	Caps to axle brackets	Steel.

* Pair.

List of parts, location and material, with correct nomenclature—Continued.

Number.	Name of part.	Location.	Material.
	Trunnion carriages, etc.:		
a1	Slide rails.....	Top of flasks.....	Cast steel.
a1	Trunnion carriages.....	On slide rails.....	Do.
a1	Cap squares.....	On trunnion carriage.....	Do.
6	Cap-square bolts.....	Cap squares to trunnion carriages.....	Do.
a1	Recoil cylinders.....	End of slide rails.....	Steel.
12	Bolts for recoil cylinders.....	Cylinders to slide rails.....	Do.
2	Front caps for recoil cylinders.....	End of cylinders.....	Do.
4	Filling and vent plugs.....	Screwed in cylinders.....	Do.
1	Equalizing pipe, complete.....	Connects cylinders.....	Copper.
2	Copper tubes.....		Do.
2	Nipples.....		Steel.
4	Followers.....	Riveted to front transom on coupling.....	Bronze.
1	Emptying coupling.....		Do.
1	Emptying-coupling plug.....		Do.
2	Pistons.....	In cylinders.....	Steel.
2	Piston liners.....	On piston heads.....	Bronze.
2	Throttling rods for recoil cylinders.....	Screwed to front cap.....	Steel.
2	Throttling-rod bushing.....	On throttling rods.....	Bronze.
2	Glands for recoil cylinders.....	Screwed in rear of cylinder.....	Do.
2	Followers for recoil cylinders.....	On glands.....	Steel.
4	Recoil springs.....	Rear of trunnions.....	Do.
2	Separators.....	Between springs.....	Bronze.
2	Spring centers, front.....	In spring columns.....	Do.
2	Spring centers, rear.....	.....do.....	Steel.
2	Compression bolts.....	Connect centers.....	Do.
2	Adjusting screws.....	Centers to trunnion beds.....	Do.
2	Set screws.....	For adjusting screws.....	Do.
2	Locking bolts.....	Trunnion beds to slide rails in traveling.....	Bronze.
2	Carrying collars.....	End of pistons in traveling.....	Do.
	Elevating apparatus:		
1	Elevating shaft.....	On right trunnion carriage.....	Steel.
2	Worm buffers.....	On shaft.....	Spring steel.
1	Sliding bearing.....	.....do.....	Steel.
1	Elevating worm.....	.....do.....	Bronze.
1	Compression nut.....	On end of shaft.....	Do.
1	Elevating arc.....	Bolted to howitzer.....	Do.
8	Elevating-arc bolts.....	Arc to howitzer.....	Steel.
1	Miter bracket.....	Screwed and bolted to flask.....	Cast iron.
2	Miter-bracket bolts.....	Bracket to flask.....	Steel.
2	Elevating miters.....	On bracket.....	Bronze.
1	Elevating wheel.....	On end of miter shaft.....	Steel.
1	Elevating-worm cap.....	Covers worm.....	Cast steel.
4	Worm-cap bolts.....	Caps to trunnion carriages.....	Steel.
1	Brake cylinder.....	Under flask.....	Do.
1	Cylinder head.....	On cylinder.....	Cast steel.
2	Hook bolts with nuts.....	Head to cylinder.....	Steel.
1	Piston for brake cylinder.....	In cylinder.....	Do.
1	Piston liner.....	On piston head.....	Bronze.
1	Piston eye.....	End of piston rod.....	Steel.
1	Taper pin.....	Eye to piston rod.....	Do.
1	Gland for brake cylinder.....	Rear end of cylinder.....	Bronze.
1	Follower.....	On gland.....	Steel.
1	Throttling rod for brake cylinder.....	Screwed into front cap.....	Do.
1	Throttling-rod bushing.....	Screwed on rod.....	Bronze.
2	Filling and drain plugs for brake cylinder.....	In front cap.....	Steel.
1	Pintle plate.....	Bolted to platform.....	Cast steel.
6	Pintle-plate bolts.....	Plate to platform.....	Steel.
1	Pintle nut.....	On pintle.....	Do.
1	Pintle washer.....	.....do.....	Do.
1	Yoke.....	Cylinder head to pintle.....	Do.
2	Yoke-journal pins.....	Ends of yoke.....	Do.
2	Taper pins.....	Journals to yoke.....	Do.
	Wheels and axle:		
1	Axle.....	Steel tube under flask.....	Do.
2	Spindles.....	In ends of axle.....	Do.
2	Axle collars.....	At inner shoulder of spindle (acting as dustguard). On spindles.....	Do.
2	Wheels.....	End of spindle.....	Do.
2	Washers.....	Through end of spindle.....	Do.
2	Linchpins.....	Pivoted on pins.....	Do.
2	Linchpin clamps.....		Do.
	Road brakes:		
1	Brake shaft.....	In bearings under flasks.....	Do.
2	Brake-shaft bearings.....	Riveted to lower flange of flasks.....	Bronze.
2	Bearing caps.....	Bolted to bearings.....	Do.
4	Cap bolts.....	Caps to bearings.....	Steel.
2	Brake-shoe pins.....	In ends of brake shaft.....	Do.
2	Shoe holders.....	Keyed on brake-shoe pins.....	Cast steel.

a Pair.

List of parts, location and material, with correct nomenclature—Continued.

Number.	Name of part.	Location.	Material.
	Road brakes—Continued.		
2	Collars	On end of brake-shoe pins	Steel.
2	Brake shoes	Bolted to holders	Wro't iron.
4	Brake-shoe bolts	Shoes to holders	Steel.
2	Brake-shaft ties	End of shaft to flask	Do.
2	Tie plates	Riveted to flask	Do.
2	Tie bolts	Tie to tie plate and flask	Do.
1	Brake-shaft lever	On brake shaft	Do.
1	Reach rod	Connects shaft lever and brake-rod crank.	Do.
1	Brake-rod crank	Keyed to maneuvering shaft	Cast steel.
1	Brake-lever socket	For brake-rod crank	Steel.
1	Gib key	Keyed to maneuvering shaft	Cast steel.
1	Brake lever	For lever socket	Steel.
1	Brake-catch pawl	Fits in lever socket	Do.
1	Locking pin	Riveted to shoe plate	Do.
1	Brake stop	Chained to lever socket	Do.
1	Brake-lock bearing	Riveted to left flask	Do.
1	Brake-lock handle and bolt	Screwed into left flask	Bronze.
1	Brake spring	Fits in lock bearing	Steel.
1	Spring hook	End of reach rod	Do.
1	Name plate	Riveted to left flask	Do.
		On right flask	Bronze.

Price of carriage, complete, \$3,000.

LIMBER.

The limber for all model carriages is the same as that for the 5-inch B. L. rifle (siege).

For list of parts, etc., see page 405.

For price of limber, see page 405.

AMMUNITION WAGON.

The ammunition wagon is the same as issued for the 5-inch B. L. siege rifle battery. For list of parts, etc., see page 406.

For price of ammunition wagon complete see page 407.

SPARE PARTS FOR CARRIAGE.

The following spare parts of 7-inch B. L. howitzer carriage are issued and carried on one of the conveyances of siege train, to wit (estimated one year's supply):

	Price each.
1 spring center, front	\$4.50
1 spring center, rear	
1 compression bolt	
4 outer recoil springs	
4 inner recoil springs	
2 spring separators	
6 filling and drain plugs for hydraulic buffers	
6 filling plug screw bolts	
10 throttling-bar screw bolts for hydraulic buffers	
10 copper washers for throttling-bar screw bolts	
16 throttling-bar screw bolts for recoil cylinders	
10 filling and drain plugs for recoil cylinders	
9 worm-buffer washers, bronze	
9 worm-buffer washers, leather	
36 split keys, assorted	
1 pound wick packing for hydraulic cylinders	

* Expendable.

The following parts of carriage are also issued, when needed, for minor repairs:

	Price each.
Stop springs.....	
Tool box securing pins.....	
Keys and chains.....	
Key chains.....	
Wheels, complete.....	\$87.00
Nave boxes—	
Nave box flange bolts.....	
Nave box flange bolt nuts.....	
Nave box assembling nut lock.....	
Nave box assembling nut lock screw.....	
Spokes.....	
Linch pins.....	1.90
Linch washers.....	
Linch pin clamps.....	
Cap square bolts, long.....	
Cap square bolts, short.....	
Cap square oil hole stoppers.....	
Road brakes complete, model 1890.....	185.87
Parts of road brake—	
Brake plate.....	
Handwheel sleeve bracket.....	
Bolts for handwheel sleeve bracket.....	
Handwheel sleeve.....	
Oil plug for handwheel sleeve.....	
Handwheel.....	
Handwheel collar nut.....	
Collar-nut set screws.....	
Brake screw.....	
Brake truss.....	
Brake stops.....	
Brake truss pin.....	
Brake springs.....	
Brake pins.....	
Brake hinges.....	
Brake hinge pins.....	
Brake lever eyes.....	
Brake lever tubes.....	
Brake shoes.....	
Wearing shoes.....	
Wearing shoe bolts.....	
Brake lever fastening.....	
Key and chain for brake lever.....	
Brake spring fastening.....	
Split keys.....	
Attachments for handspikes and sponge and rammer staves, model 1890:	
Rammer staves, front.....	
Rammer staves, rear.....	
Roller handspike, front.....	
Roller handspike, rear.....	
Maneuvering handspikes, front.....	
Maneuvering handspikes, rear.....	
Handspike attachment plate.....	
Road brakes, model 1893:	
Parts of road brake—	
Brake shaft.....	
Brake shaft bearings.....	
Bearing caps.....	
Cap bolts.....	
Brake shoe pins.....	
Shoe holders.....	
Collars.....	
Brake shoes.....	
Brake shoe bolts.....	
Brake shaft ties.....	
Tie plates.....	
Tie bolts.....	
Brake shaft lever.....	
Reach rod.....	
Brake rod crank.....	
Gib key brake lever socket.....	
Gib key.....	
Brake lever.....	
Brake catch pawl.....	
Locking pin.....	
Brake stop.....	
Brake lock bearing.....	
Brake lock handle and bolt.....	
Brake spring.....	
Spring hook.....	

If a carriage should be materially damaged authority should be applied for to turn it in to Rock Island Arsenal.

SPARE PARTS FOR AMMUNITION WAGON.

See spare parts for ammunition wagon 5-inch B. L. rifle (siege) page 408.

In ordering spare parts always give the model and number of carriage or ammunition wagon (shown on plate attached to both) for which parts are required.

PLATFORMS AND PLATFORM WAGONS.

See platforms and platform wagons 5-inch B. L. rifle siege battery, page 409 and 410.

For prices of platforms and platform wagons, see pages 409 and 411.

FORGE AND BATTERY WAGON.

The combined forge and battery wagon issued to siege batteries is the same as that used by light batteries.

For list of parts, nomenclature for same, etc., see page 484.

For list of tools, materials, etc., carried in the same, see pages 446-448.

For price of forge and battery wagon, see page 471.

ARTILLERY STORE WAGON.

The artillery store wagon issued to siege batteries is the same as that used by light batteries.

For list of parts, nomenclature for same, etc., see page 488.

For list of tools, materials, etc., carried with same, see page 498.

For price of artillery store wagon, see page 472.

SUBCALIBER TUBE.

Subcaliber tube fittings for .30 caliber rifle barrel are issued for use with 7-inch B. L. howitzer, one to each gun. The list of parts of subcaliber fittings are the same as given for the 5-inch B. L. rifle (siege), page 411. (Price of attachment complete, \$77.)

The detailed cost of the principal parts of subcaliber fittings is as follows:

Breech plate.....	\$27. 90
Breech-plate sleeve.....	26. 00
Muzzle sleeve.....	8. 98
Recoil arm.....	3. 00
Recoil-arm stand.....	1. 50
Components of rifle.....	8. 30
Wrench.....	. 75
Thumb screws (2).....	. 25
Screws and washers.....	. 32
Total.....	77. 00

One year's supply of spare parts for subcaliber tube and fittings are issued to each battery, and are the same as those issued for the 5-inch B. L. rifle (siege).

For list see page —.

The following tools and equipments are furnished with each howitzer and carriage, 7-inch B. L. howitzer, model 1890, and model 1893 carriage:

			Price each.
On carriage:			
2	sections sponge and rammer staves, each 62 inches long.....		\$7.40
2	maneuvering handspikes.....		4.21
1	roller handspike.....		7.00
2	buckets, sponge, leather.....		5.96
1	lantern, railroad.....		.60
On piece:			
1	breech cover.....		2.23
1	tompson and muzzle cover.....		3.53
No.	Articles.	Location in chest.	Price each.
<i>In tool box on rear transom of carriage.</i>			
1	Can for axle grease, 1 gallon.....		\$2.15
1	Telescopic sight in sight case.....		° 160.00
1	Sperm oil can, $\frac{1}{2}$ gallon.....	Each in special compartment left end of chest.	1.76
1	Vaseline (cosmic) can, $\frac{1}{2}$ gallon d.....		1.50
1	Quadrant in quadrant box.....		16.00
1	Brass oiler.....		.25
1	Shot tray.....		5.00
a 1	Cutting pliers, 6-inch.....		.80
1	Fuze punch.....	Brackets right end of chest.....	2.40
1	Wrench for obturator nut.....		2.50
2	Wrenches for collar nut for bushing (elevating rod).....		1.76
1	Wrench for recoil-spring adjusting nut.....	Top.....	3.00
1	Wrench for rear cap of recoil cylinder.....	Middle.....	3.20
2	Bar screw-drivers.....	Bottom.....	1.42
1	Fuze wrench.....		1.25
1	Wrench for screw bolts for elevating gear.....		1.75
1	Wrench for recoil-cylinder piston-rod nut and piston-rod loop nut.....	Pockets under brass oiler.....	2.50
1	Wrench for front cap of recoil cylinder.....	Top.....	2.25
1	Screw wrench, 15-inch.....	Middle.....	.99
1	Hammer, machinist's, 16 ounces.....	Bottom.....	1.00
2	Bronze drifts.....	Upper row: pockets under $\frac{1}{2}$ -gallon cans.	.75
1	Pin punch.....		.30
1	Cold chisel, 14-inch.....		1.50
1	Vaseline (cosmic) brush.....		.10
1	Wrench for throttling-bar and filling-plug screws.....	Lower row: pockets under $\frac{1}{2}$ -gallon cans.	1.25
1	Wrench for vent cover.....		.75
6	Fuze-punch pins.....	Pocket under brass oiler.....	.18
1	Primer key.....	On partition wall.....	5.00
1	Wrench for hydraulic-buffer gland and recoil-attachment screw bolt.....		3.25
1	Wrench for cap-square screw bolt and spring-compression bolt.....	Bottom of chest under quadrant.....	3.75
1	Gunner's vent punch.....		.50
1	Gunner's reamer.....		1.25
1	Gunner's gimlet.....		1.35
1	Priming wire.....		.30
1	File, flat, hand, dead smooth, 8-inch.....	Under side of lid.....	.12
1	File, round, $\frac{1}{4}$ -inch, second cut.....		.08
1	File, half round, smooth, 8-inch.....		.10
1	Rear sight without leaf.....		
2	Right leaves.....	Pocket in wooden partition.....	
2	Wooden handles for bar screw-drivers.....	Pocket near quadrant box.....	
1	Mallet.....	Brackets against wooden partition.....	.40
1	Rammer head, bronze.....	Bottom of chest.....	5.10
1	Guard nut on rammer head.....	On rammer head.....	.25
b 1	Emery cloth, No. 00.....	In compartment right end of chest.....	.42
1	Grease knife.....		.75
1	Extractor for stop in carrier ring.....	Screw bolted on partition; left end.....	2.00
1	Gunner's pouch.....		2.75
1	Lanyard, 30 feet, in pouch.....		.84
8	Wagon sponges.....	Loose in chest.....	.50
12	Silk wipers.....		.20
1	Sponge head.....		4.83
1	Sponge cover, on head.....		.32
1	Steel tool box.....		66.50

a Pair.
b Quire.

° Model 1898—price of model 1897, \$125.
d Vaseline to be superseded by light slushing oil.

Tools and equipment contained in tool box for 7-inch siege howitzer carriage, model 1899, and howitzer model 1890 or 1898.

	Price each.
Axle-grease can, 1-gallon.....	\$2.15
Telescopic sight in case.....	(4)
Sperm-oil can, 1-gallon.....	1.75
Vaseline can, 1-gallon.....	1.50
Quadrant in quadrant box.....	16.00
Oiler, brass.....	.25
Shot trays.....	5.00
Cutting pliers, 6-inch.....	.50
Fuze punch.....	3.40
Wrench for obturator nut ^a	2.50
Brass plug for removing vent-shield holder ^a.....	.42
Grease knife.....	.75
Bar screw-drivers (2).....	1.42
Wrench for pintle nut.....	3.30
Wrench for cap square and spring compressor bolts.....	3.75
Spanner wrench for spring compressor.....	2.40
Screw wrench, 15-inch.....	.99
Hammer, machinists.....	1.00
Compression bolts (2) in case.....	4.88
Fuze wrench.....	1.25
Wrench for piston rods and screw bolts for elevating arc.....	1.75
(Same wrench is used for filling screw plugs and throttling bars.)	
Screw-driver wrench for obturator nut and lever-handle pivot ^a	3.25
Fuze-punch pins (6).....	.15
Primer key.....	5.00
Extractor for stop in carrier ring ^b	2.00
Bronze drifts (2).....	.75
Pin punch.....	.30
Pin punch for pin in lever handle pivot nut ^c.....	.09
Cold chisel, 1 1/2-inch.....	1.50
Vaseline brush.....	.10
Screw-driver, small, for screw in back of vent shield ^c.....	.43
Wrench for vent cover ^b.....	.75
Wrench for cylinder glands and recoil-spring attachments.....	7.06
Vent punch (gunners).....	.50
Vent reamer (gunners).....	1.25
Vent gimlet (gunners).....	1.35
Priming wire.....	.90
File, flat, hand, dead smooth, 8-inch.....	.12
File round, 1/4-inch, second cut.....	.06
File, half round, smooth, 8-inch.....	.10
Rear sight without leaf.....	
Sight leaves (2).....	
Handles (2) for bar screw-drivers.....	
Emery cloth, No. 00, 1 quire.....	.42
Mallet, wooden.....	.40
Carrying coils (2).....	
Lock bolts (2).....	4.31
Gunners pouch.....	2.75
Lanyard, 30-foot.....	.50
Wagon sponges (3).....	.50
Silk wipers (12).....	.30 1/2
Sponge head.....	4.55
Sponge cover.....	.35
Guard out.....	.25
Bronze rammer head.....	5.10
Bifurcated washers, 1-inch (2).....	3.35
Bifurcated washers, 1/4-inch (2).....	2.45
1 steel tool box.....	66.50

^a Model of articles thus marked carried in box will correspond to model of howitzer mounted on carriage.

^b Carried in box only when model 1890 howitzer is mounted.

^c Carried in box only when model 1898 howitzer is mounted.

^d Model 1897, \$125; model 1898, \$160.

DUMMY PROJECTILES.

Dummy projectiles and cartridges are issued to each siege battery for instruction and drill, the allowance being one projectile and cartridge to each gun.

HARNESSES.

The harness for 7-inch howitzer battery is the same as that issued for 5-inch B. L. rifle siege battery. (See p. 513.)

AMMUNITION.

The allowance of ammunition, service and subcaliber, for target practice and instructions, is fixed annually and published in General Orders. The allowance is for the fiscal year and not the calendar year as heretofore. (See G. O., 99, A. G. O., 1903.)

The supply of ammunition to be kept on hand by a 7-inch howitzer battery will be sufficient quantity to fill the ammunition wagons of the battery, and in addition a sufficient quantity to cover the needs of annual target practice.

7-INCH B. L. MORTAR BATTERY.

The composition and equipment of a 7-inch B. L. mortar battery has not been determined.

WEIGHT, DIMENSIONS, ETC., OF 7-INCH B. L. MORTAR, MODEL 1892.

Weight, 1,715 pounds.
 Distance between rimbases, 14.3 inches.
 Length of trunnions, 4 inches.
 Distance of axis of trunnion from muzzle, 34.15 inches.
 Total length, 4.86 feet.
 Length of bore, 7 calibers.
 Maximum diameter of breech, 13.8 inches.
 Diameter of muzzle, 10.5 inches.
 Diameter of trunnions, 7 inches.
 Powder chamber:
 Diameter, 7.25 inches.
 Length, 4.18 inches.
 Capacity, 182.18 cubic inches.
 Travel of projectile in bore — caliber, 44.8175 inches.
 Projectile:

Kind.	C. I. shell.	Steel shell.	Shrapnel.
Weight, filled and fused.....pounds..	125	125	125
Ratio of weight to weight of piece.....	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
Weight of bursting charge (rifle powder).....pounds..	12.5	6.8	1.9
Length.....calibers..	8.5	8	2.4
Sectional density.....			
Price.....	\$85.00	\$111.50	\$10.00

^a Maximite or explosive "D."

^b Without fuse.

Powder:

Kind, sphero-hexagonal and smokeless.
 Weight, 6 pounds sphero-hexagonal; 1.75 pounds smokeless.
 Density of loading, 0.9086 sphero-hexagonal; 0.2105 smokeless.

Muzzle velocity:

Sphero-hexagonal, 700 feet per second.
 Smokeless, 710 feet per second.

Maximum pressure per square inch:
Sphero-hexagonal, 20,000 pounds.
Smokeless, 17,000 pounds.

Muzzle energy:

Sphero-hexagonal, 425 foot-tons.
Smokeless, 437 foot-tons.

Rifling:

Number of grooves, 28.
Width of grooves, 0.6354 inch.
Depth of grooves, 0.055 inch.
Width of lands, 0.15 inch.

Twist of rifling, one turn in 40 calibers at origin, one turn in 15 calibers at — inches from muzzle, being uniform over the — inches.

POWDER NOTE.—The charge of powder given is the maximum charge. The weight of charge varies with the range. For issues in bulk the average charge is assumed to be three-fourths of the maximum.

7-INCH B. L. MORTAR, MODEL 1892.

The designation, "One 7-inch B. L. mortar, model 1892," in correspondence, invoice, receipts, requisitions, etc., comprises the mortar proper, with its attached parts, and breech mechanism complete, as per list below.

The quadrant, etc., are issued with the armament chest.

List of parts in "One breech mechanism complete," for 7-inch B. L. mortar.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One block carrier, complete:					
Hinge-pin	1	Steel....	Hinge block carrier to mortar.	Interchangeable all mortars this model.	
Block carrier	1	....do....	Encircles breechblock.	....do....	Carrier ring.
Block stop	1	....do....	Upper part of block carrier.	Carefully fitted to individual mortar.	Stop, stop-bolt, guide-bolt.
Block-stop screw...	1	....do....	Secures block-stop in block carrier.	Interchangeable all mortars this model.	
Block-stop screw plug.	1	....do....	Fills threaded hole provided for extraction.	....do....	
Carrier latch bolt...	1	Norway iron.	In latch recess in block carrier.	....do....	Latch, latch pin, latch bolt.
Carrier latch spring.	1	Steel....	In latch recess behind carrier latch bolt.	....do....	
Carrier latch cover.	1	....do....	Covers latch recess in block carrier.	....do....	Latch housing.
Carrier latch screws.	2	....do....	Secures latch cover to block carrier.	....do....	
One breechblock, complete:					
Breechblock	1	....do....	In breech of mortar; secured to block carrier by block stop (and when open, by carrier latch bolt).	....do....	Breech plug, breech screw.
Block handles	2	....do....	Dovetailed and screwed rear end breechblock.	Carefully fitted to individual mortar.	
Block-handle screws	2	....do....	Screwed handles to breechblock.	Interchangeable all mortars this model.	
Block-lock bolt	1	....do....	In rear end breechblock; engages in block carrier.	....do....	Lock bolt.
Block-lock handle..	1	....do....	On outer end block-lock bolt.	....do....	Wing nut.

List of parts in "One breech mechanism complete," for 7-inch B. L. mortar—Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One breechblock, complete—Continued.					
Block-lock handle-pin.	1	Steel....	Secures handle to bolt.	Interchangeable all mortars this model.	
Block-lock bushing.	1	....do....	In halved; screws in to block around lock bolt.	....do....	Split bushing.
Block-lock bushing dowels.	2	....do....	In block-lock bushing, to secure halves in proper position.	....do....	
Block-lock spring..	1	....do....	Actuates spring pin, which retains lock-bolt in either open or locked position.	....do....	
Block-lock spring pin.	1	....do....	.....	....do....	
Vent covers.....	1	....do....	Covers vent; actuate by block-lock bolt.	....do....	
Vent-cover retaining screws.	2	....do....	Through slots in vent cover into breech block.	....do....	Vent-cover guide screws.
Vent-cover guide screw.	1	....do....	In breechblock above block lock bolt, bearing against side of vent cover.	Interchangeable; all mortars this model that are drilled for it.	
One obturator, complete:					
Obturator spindle, complete—					
Obturator spindle.	1	....do....	Through center bore of breechblock.	Interchangeable all mortars this model.	Spindle, mushroom head and spindle. (The term "obturator" should never be used for "obturator spindle.")
Vent bushing.....	1	Copper.	Front end of vent in spindle.	Not removable. As issued fits any mortar this model. Not invoiced when sent in place in obturator spindle.	
Obturator nuts...	1	Steel...	On rear part obturator spindle.	Interchangeable all mortars this model.	Adjustable nut.
Obturator clamps	1	....do....	On obturator spindle, behind and locking obturator nut.	....do....	Clamping collar nut.
Obturator-clamp screw.	1	....do....	Tightens clamping collar.	....do....	
Obturator washers.	2	Steel....	Replace obturator spring formerly issued.	....do....	Spindle antifriction washer.
	1	Bronze.		....do....	
Front split ring....	1	Steel....	Between pad and head of obturator spindle.	....do....	
Rear split ring....	1	....do....	Between pad and filling-in disk.	....do....	
Small split ring....	1	....do....	On obturator spindle, rear inner edge of pad.	....do....	Spindle split ring.
Gas-check pad.....	1	Tallow and asbestos in canvas.	Between front and rear split rings.	....do....	Gas check.
Filling-in disk.....	1	Steel....	Between breechblock and gas-check pad.	....do....	Gas-check disk.

List of parts in "One breech mechanism complete," for 7-inch B. L. mortar—Continued.

PARTS ATTACHED TO MORTAR PROPER, BUT REMOVABLE.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Retracting stud	1	Steel....	In recess at breech for block carrier.	Interchangeable all mortars this model.	Conical stud, operating stud, latch stud.
Elevating plate	1	....do...	In left trunnion .....	....do	
Elevating-plate screws.	8	....do...	Secure elevating plate to trunnion.	....do	

^a As now issued. The obturator nut originally issued was prevented from rotation by a spline screw, and there was an obturator spring instead of the present obturator washers to reduce friction in rotation of block when the pad sticks. If old form of obturator nut is wanted, requisition should so state.

Price of mortar complete, \$1,351.

SIGHTS.

GUNNERS' QUADRANTS.

One quadrant is issued with each mortar.

For list of component parts see page 325.

For description, etc., see pamphlet published by Ordnance Department, "Handbook of Sights for Cannon, 1899."

FUSES.

The following fuses are used for 7-inch B. L. mortar projectiles:

For shell—low resistance base-fuse A. For prices see page 345, etc.

For shell detonating fuse—low resistance base-fuse C. For prices see page 345, etc.

For shrapnel—low resistance 28-second combination fuse. For prices see page 347.

For list of parts of fuses see page 345, etc.

For full description of fuses see pamphlet "Fuses for Field, Siege, and Seacoast Powder-charged Shell and Shrapnel," issued by Ordnance Department.

PRIMERS.

The following primers are used with 7-inch B. L. mortar:

Seacoast obturating (screwed) friction primers. For prices see page 352.

For list of spare parts issued with these guns see page 439. For prices see page 439.

7-INCH B. L. MORTAR CARRIAGE, MODEL 1895.

List of parts and material, with correct nomenclature.

Name of part.	Location.	Material	Number.	Diameter.	Length.	Nuts.	Washers	Remarks.
Air plug.....	Top of cylinder..	Steel	2	Inches. .26	Inches. .47	.....	2	Hexagon head, leather washer, .05 inch thick.
Bolts	Throttling bars..	Wrought iron.	4	.5	.7	.....	4	Hexagon heads, copper washers.
Do.....	do.....	do.....	8	.5	.9	.....	8	Do.
Do.....	Trunnion car...	Steel	4	1	2.25	.....		Round heads, slotted for wrench.
Do.....	do.....	do.....	4	1	2	.....		Do.
Do.....	Clips to platform.	Wrought iron.	11	1.5	18.5	11	16	11 round washers and 4 square washers.
Do.....	Cylinder to chassis.	do.....	8	.75	4.1	8	.....	Hexagon heads and nuts.
Cap square	Trunnion car....	Cast steel.....	1	.....	.....	.....	.....	Right hand.
Do.....	do.....	do.....	1	.....	.....	.....	.....	Left hand, tapped for trunnion clamp.
Chassis	Riveted to transoms.	Forged steel, No. 1	1	.....	.....	.....	.....	Right hand.
Do.....	do.....	do.....	1	.....	.....	.....	.....	Left hand.
Clip	Bolted to platform.	Cast steel.....	1	.....	.....	.....	.....	Front clip.
Do.....	do.....	do.....	1	.....	.....	.....	.....	Rear clip.
Clip braces....	Bolted to clips..	Steel.....	2	.....	.....	.....	.....	One top and one bottom.
Compression bolt.	Recoil springs..	do.....	2	.75	25	.....	.....	Brown & Sharpe worm thread cut 18 inches from end.
Counter recoil springs.	Between trunnion car and spring bolster.	do.....	4	.....	.....	.....	.....
Cylinders.....	Bolted to chassis.	Forged steel, No. 8.	2	.....	.....	.....	.....
Cylinder heads	Top of cylinder..	do.....	2	.....	.....	.....	.....	Slotted for spanner wrench. Male part of counter recoil buffer on inside.
Dust plug.....	Lower end of outer spring center.	Bronze	2	.875	1	.....	.....	Hexagon head 12 threads per inch, .0125 inch hole through center for vent.
Ear straps	Riveted to chassis at top.	Forged steel, No. 1.	4	.....	.....	.....	.....	Two right and two left.
Elevating bracket.	Left trunnion of mortar.	Steel.....	1	.....	.....	.....	.....	Slotted for pinch bar.
Filling and emptying plug	Screwed into cylinder.	Wrought iron.	4	.5	.55	.....	4	Hexagon head, leather washers.
Gland stuffing box	Lower end of cylinder	Bronze	2	.....	.....	.....	.....
Guides.....	Riveted to top of chassis	Forged steel..	2	.....	.....	.....	.....	One right and one left hand.
Liners	Screwed to trunnion car	Bronze	2	.....	.....	.....	.....
Lag screws	Traverse plates..	Wrought iron.	12	.75	6	.....	.....	Countersunk head, slotted.
Name plate....	Fastened to right chassis	Brass.....	1	.....	.....	.....	.....
Nut plug	Lower end of inner spring center	Bronze	2	2.125	3	.....	.....
Lock nut	Piston rod.....	Wrought iron.	2	2	.....	.....	.....	Hexagon 2.75 inches across the flats, .05 inch thick, tapped 10 threads per inch.
Pinch bar	For elevating and traversing.	Steel.....	2	.....	.....	.....	.....
Piston	Inside cylinders.	Forged steel, No. 8.	2	.....	.....	.....	.....	Hexagon on one end 1.75 inches across flats for wrench.

List of parts and material, with correct nomenclature—Continued.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Washers.	Remarks.
				Inches.	Inches.			
Plate, foot.....	Riveted to bottom of chassis.	Forged steel..	2					One right and one left.
Separator.....	Between springs.	Bronze.....	2	5	1.625			
Screws, adjusting.	Screwed into spring bolster.	.....do.....	2	3	3.375			
Screws.....	Liners to trunnion car.	Brass.....	20	.25	.5			Countersunk head.
Do.....	Elevation bracket.	Wrought iron.	3	1	3			Round head, slotted.
Do.....	Name plate.....	Brass.....	2	.25	.5			Round head.
Do.....	Fastens nut plug into inner spring center.	Steel.....	2	.375	.75			Headless, slotted for screw, driver.
Screws, cylinder fastening.	Fastening cylinders to chassis.	Wrought iron.	4	.5	1.6			Round head, slotted.
Spring center.	Screwed into trunnion car.	Bronze, No. 3.	2					Inner.
Do.....	Fitted to spring bolster.	Steel.....	2					Outer.
Spring bolster.	Riveted to chassis.	Cast steel.....	1					Left hand.
Do.....	.....do.....	.....do.....	1					Right hand.
Stuffing box cap.	Lower end of cylinder.	Bronze.....	2					Screwed on to lower end of cylinder and slotted for spanner wrench.
Transom.....	Riveted to chassis.	Forged steel, No. 1.	1					Front 8, 0.75-inch rivets.
Do.....	.....do.....	.....do.....	1					Second 12, 0.75-inch rivets.
Do.....	.....do.....	.....do.....	1					Rear 12, 0.75-inch countersunk rivets.
Traversing lug.	Riveted to front of chassis.	Wrought iron.	2					One right and one left.
Traverse plate.	Screwed to platform.	Steel.....	2					
Do.....	.....do.....	.....do.....	1					Rear.
Throttling bars.	Bolted inside cylinders.	Forged steel..	4					
Trunnion carriage.	On guides.....	Cast steel.....	1					Left hand.
Do.....	.....do.....	.....do.....	1					Right hand.
Trunnion clamp.	Left trunnion car.	Steel.....	1	0.75				
Toe plate.....	Riveted to transom.	Forged steel, No. 1.	1					
Toe-plate knee.	Riveted to second transom and toe plate.	Cast steel.....	1					
Double wrench.	For 0.25-inch and 0.5-inch nuts.	Steel.....	1					
Do.....	For 0.625-inch and 0.75-inch nuts.	.....do.....	1					
Single wrench.	For piston-rod lock nuts and adjusting screws.	.....do.....	1					
Do.....	For piston rod...	.....do.....	1					1.77 inches across flat.
Do.....	For 1.5-inch nut.	.....do.....	1					
Spanner wrench.	For stuffing boxes.	.....do.....	1					
L.screw-driver	For elevating bracket and traversing plate screws.	.....do.....	1					
Socket wrench.	Deck strips, lag screws.	.....do.....	1					
Screw-driver..	Name plate and liner screws.	Steel, wooden handle.	1		10"			
Funnel.....	Filling cylinders.	Brass.....	1					1/8 inch thick.
Oil can.....	.....do.....	.....do.....	1					Capacity, 1 pint.

Price of carriage, \$900.00, with platform.

7-INCH B. L. MORTAR CARRIAGE PLATFORM.

List of parts, material, etc., with correct nomenclature.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Nuts.	Washers.	Remarks.
Bolts	Stringers to bottom timber.	Wrought iron.	6	Inch. 0.625	Inches. 13.75	6	12	Hexagon head, marked "a."
Do	do	do	6	0.625	15.25	6	12	Hexagon head, marked "b."
Bottom timbers	Bolted to stringers.	Yellow pine..	2					6 by 10 by 87 inches, dressed on top.
Do	do	do	1					6 by 6 by 87 inches, dressed on top.
Do	do	do	1					6 by 6 by 75 inches, dressed on top.
Deck strips	Screwed to stringers.	Oak	28					3 by 4 by 75 inches, dressed all over, laid $\frac{1}{4}$ inch apart.
Do	do	do	5					3.5 by 4 by 75 inches, dressed all over, laid $\frac{1}{4}$ inch apart.
Lag screw	Deck strips to stringers.	Wrought iron.	81		6		81	
Posts	Under platform.	Yellow pine..	12					Pointed on one end.
Stringers	Bolted to bottom timbers.	do	6					6 by 6 by 134.25 inches, dressed on top and bottom.

Price of platform, \$153.75.

Contents of armament chest for 7-inch B. L. mortar, model 1892, and 7-inch mortar carriage, model 1895.

	Price each.
2 bronze drifts	\$0.75
1 cold chisel, 1 $\frac{1}{2}$ -inch	1.50
1 cutting pliers, 6-inch .....	.50
1 funnel, brass	
1 file, half-round, smooth, 8-inch .....	.10
1 file, flat, dead smooth, 8-inch .....	.12
1 file, flat, half-round, second cut, 8-inch .....	.10
1 file, three-cornered, second cut, 8-inch .....	.10
1 gunner's gimlet	1.25
1 gunner's reamer	1.25
1 gunner's quadrant	16.00
1 guard nut .....	.25
1 gunner's pouch	2.75
1 pair gunner's sleeves .....	.95
1 hammer, machinist	1.00
1 lanyard, 15-inch .....	.75
1 mallet, hand .....	.40
1 metal scraper .....	.95
1 roller, brass .....	.25
1 pin punch .....	.30
1 priming wire .....	.90
1 rammer head, bronze	5.10
1 shot tray	5.00
1 sperm-oil can, $\frac{1}{2}$ gallon	1.75
1 sponge head	
1 sponge (on sponge head)	
1 sponge cover .....	.37
3 wagon sponges .....	.50
12 silk wipers .....	.20 $\frac{1}{2}$
1 screw-driver, 10-inch	
1 screw-driver, 15 $\frac{1}{2}$ -inch	
1 screw-driver, 22-inch	
1 screw-driver "L"	2.10
1 vaseline brush .....	.10
1 vaseline can, $\frac{1}{2}$ gallon	1.60
1 vent punch .....	.50
1 wrench, socket	3.30
1 wrench, adjustable nut	3.42
1 wrench, clamping collar screws	1.35
1 wrench, piston rod and thrust nuts	5.10
1 wrench, screw, 15-inch .....	.99

a Vaseline to be superseded by light slushing oil.

Contents of armanent chest for 7-inch B. L. mortar, model 1892, and 7-inch mortar carriage, model 1895—Continued.

	Price each.
1 wrench, single, 1½-inch nut.....	\$5.10
1 wrench, single, 1-inch nut.....	2.90
1 wrench, double, 0.25-inch and 0.5-inch nuts.....	1.66
1 wrench, double, 0.625-inch and 0.75-inch nuts.....	3.66
1 wrench, spanner, recoil cylinder head.....	4.55
1 wrench, spanner, latch-stud bushing.....	1.25
1 quire emery cloth, No. 60.....	.42
1 armanent chest.....	80.00

DIFFERENCES IN FIRST AND SECOND MODEL 1895.

7-INCH B. L. MORTAR CARRIAGES.

The principal changes in the second model 1895, 7-inch B. L. mortar carriage, from the first are as follows:

1. Vent plug added to recoil cylinder.
2. Hexagon milled on the piston rod for convenience in assembling.
3. Counter recoil springs and spring centers changed.
4. Spring bolsters modified and a new method of assembling and adjusting the springs provided.
5. Clip braces added.
6. Slight modification in the socket wrench and that for the piston rod.

SPARE PARTS FOR MORTAR.

The following spare parts are issued for 7-inch B. L. mortar to each battery, and carried in one of the available compartments of one of the conveyances with a siege train when equipped with this arm:

Part.	Price each.
4 obturator springs.....	\$3.50
6 carrier latch bolts.....	2.00
12 carrier latch springs.....	.50
4 gas check pads.....	8.50
2 front split rings.....	6.50
2 small split rings.....	8.50
2 rear split rings.....	4.00
6 vent bushings, copper.....	

The following spare parts for breech mechanism of 7-inch B. L. mortar are kept on hand at arsenals and will be issued from time to time as required:

Part.	Price each.
Vent covers.....	\$3.25
Block-lock bolts.....	3.50
Block-lock handle.....	2.50
Block-lock handle pins.....	.25
Block-lock bushing dowels.....	1.50
Block-lock springs.....	.50
Block-lock bushings.....	1.25
Vent-cover retaining screws.....	.50
Retracting studs.....	1.50
Carrier latch covers.....	4.50
Carrier latch-cover screws.....	1.00
Block stops.....	4.00
Block-stop screws.....	.50
Hinge pins.....	2.00
Obturator nuts.....	3.00
Obturator clamps.....	3.50

SPARE PARTS FOR 7-INCH B. L. MORTAR CARRIAGE.

The following spare parts for 7-inch B. L. mortar carriage are issued for each carriage when in service, to be carried in one of the available compartments of one of the conveyances with siege trains:

Part.	Price, each.
1 set of filling plugs
1 set of emptying plugs
1 set of vent plugs
1 set of gaskets for carriage
1 set of piston-rod packing
1 trunnion clamp
1 dozen washers for platform bolts
1 dozen nuts for platform bolts
1 adjusting screw
1 dust plug

Cannon, U. S. Army; weights, dimensions, and principal differences between models, siege artillery.

[Projectiles (abbreviations): C. I., cast iron; C. S., common steel.]

	5-inch B. L. rifles.			7-inch B. L. howitzers.			7-inch B. L. mortar.
	Model 1850.	Models 1868 and 1898 M.L.C.	Model 1890.	Model 1890.	Model 1898.	Model 1892.	
Numbers of guns	1-32. Wt. and Tube	1 up., Wt. and Tube	1-40. Wt. and Tube	1 up., Wt. and Tube	1 up., Wt. and Tube	1 up., Wt. and Gun body (single steel forging).	
Principal parts of gun proper	Jacket..... Trunnion hoop..... Sleeve..... Key ring..... Locking hoop..... Breech bushing..... Interrupted screw..... 3 b.	Jacket..... Trunnion hoop..... Sleeve..... Key ring..... Locking hoop..... Breech bushing..... Interrupted screw..... 1.	Jacket..... Trunnion hoop..... Sleeve..... Key ring..... Locking hoop..... Breech bushing..... Interrupted screw..... 4 (including firing screw, black lever latch). ⁵	Jacket..... Trunnion hoop..... Sleeve..... Key ring..... Locking hoop..... Breech bushing..... Interrupted screw..... 1.	Jacket..... Trunnion hoop..... Sleeve..... Key ring..... Locking hoop..... Breech bushing..... Interrupted screw..... 1.	Jacket..... Trunnion hoop..... Sleeve..... Key ring..... Locking hoop..... Breech bushing..... Interrupted screw..... 3 b.	
Structure.	Breech locked. Withdrawn by hand.	Breech open. Ejected by raising firing attachment slide (by hand).	Breech locked. Withdrawn by hand.	Breech open. Ejected by raising firing attachment slide (by hand).	Breech open. Ejected by raising firing attachment slide (by hand).	Breech locked. Unscrewed and with- drawn by hand.	
Motions to open (or close) breech.							
Primer inserted, when.							
Primer removed, how.							
Vent axial, all siege guns.							
Obturation, all siege guns; plastic pad between split rings—2.							
Total weight of gun complete	3,620 pounds.	3,639 pounds.	3,740 pounds.	3,740 pounds.	3,650 pounds.	1,690 pounds.	
Weight of breech mechanism	117 pounds.		218 pounds.	218 pounds.		130 pounds.	
Shipping weight of gun complete.	3,550 pounds.		3,790 pounds.	3,790 pounds.		1,724 pounds.	
Tare included breech and muzzle tompons and con- necting rod, and one box per gun for breech mech- anism.							
Dimensions (outside) of breech mechanism box.	16 inches long. 13 inches wide. 11 inches deep.	16 inches long. 13 inches wide. 11 inches deep.	16 inches long. 13 inches deep. 1-inch pine.	16 inches long. 13 inches deep. 1-inch pine.	16 inches long. 13 inches deep. 1-inch pine.	19 inches long. 16 inches wide. 19 inches deep. 1-inch pine.	
Material	12-16 feet. 27 calibers. 15 inches. 6 inches. 5.5 inches. 3.5 inches. 15 inches. 95.25 inches.	11-91 feet. 27 calibers. 15 inches. 6 inches. 5.5 inches. 3.5 inches. 15 inches. 95.5 inches.	8.45 feet. 12-7 calibers. 16.7 inches. 10 inches. 4 inches. 13 inches. 64.6 inches.	8.27 feet. 12-7 calibers. 16.6 inches. 10 inches. 7 inches. 4.25 inches. 13 inches. 64.2 inches.	4.98 feet. 7 calibers. 13.8 inches. 10.8 inches. 7 inches. 4 inches. 14.3 inches. 54.1 inches.	4.98 feet. 7 calibers. 13.8 inches. 10.8 inches. 7 inches. 4 inches. 14.3 inches. 54.15 inches.	
Total length of gun							
Length of bore							
Maximum diameter, breech							
Diameter of muzzle							
Diameter of trunnions							
Length of trunnions							
Distance between rimbases							
Distance of axis of trunnions from muzzle.							

^a Model 1898 M1 is same as model 1898, except that it has hinge solid with jacket instead of in separate pieces. There are also some changes of dimensions in parts of breech mechanism.

^b Translating block and rotating about hinge are counted as one motion.

Cannon, U. S. Army; weights, dimensions, and principal differences between models, siege artillery—Continued.

	5-inch B. L. rifles.			5-inch B. L. howitzers.			7-inch R. L. mortar.		
	Model 1890.	Models 1896 and 1898 M.		Model 1890.	Model 1898.	Model 1892.			
Rifling:									
Number of grooves.....	30.....	30.....		42.....	42.....	28.....			
Width of grooves.....	0.5736 inch.....	0.5736 inch.....		0.5736 inch.....	0.5736 inch.....	0.6864 inch.....			
Depth of grooves.....	0.05 inch.....	0.05 inch.....		0.05 inch.....	0.05 inch.....	0.056 inch.....			
Width of lands.....	0.16 inch.....	0.15 inch.....		0.16 inch.....	0.16 inch.....	0.16 inch.....			
Twist.....	1 in 50 to 1 in 25 calibers.	1 in 50 to 1 in 25 calibers.		1 in 50 to 1 in 25 calibers.	1 in 50 to 1 in 25 calibers.	1 in 40 to 1 in 16 calibers.			
Powder chamber (cylindrical):									
Length.....	15.16 inches.....	15.16 inches.....		7.465 inches.....	7.465 inches.....	4.18 inches.....			
Diameter.....	5.7 inches.....	5.7 inches.....		7.2 inches.....	7.2 inches.....	7.25 inches.....			
Capacity.....	402.5 cubic inches.....	402.5 cubic inches.....		316.7 cubic inches.....	316.7 cubic inches.....	192.8 cubic inches.....			
Total capacity of bore.....	2,824.5 cubic inches.....	2,816.7 cubic inches.....		3,499 cubic inches.....	3,499 cubic inches.....	1,961 cubic inches.....			
Travel of shot.....	119.8 inches.....	119.8 inches.....		81.366 inches.....	81.366 inches.....	44.676 inches.....			
Ammunition.....	Projectile, charge, and primer separate.	Projectile, charge, and primer separate.		Projectile, charge, and primer separate.	Projectile, charge, and primer separate.	Projectile, charge, and primer separate.			
Projectile:									
Kind.....	C. I. shell.	C. S. shell.	Shrapnel.	C. I. shell.	Steel shell.	Shrapnel.	C. I. shell.	Steel shell.	Shrapnel.
Length.....	3.....	2.6.....	2.4.....	3.....	2.5.....	2.2.....	3.....	2.4.....	2.2.....
Weight, fitted and fished.....	45.....	45.....	45.....	105.....	105.....	105.....	125.....	125.....	125.....
Ratio, weight to weight of powder.....	1.81.....	1.81.....	1.81.....	1.81.....	1.81.....	1.81.....	1.13.....	1.13.....	1.13.....
Weight of bursting charge, rifle powder.....	2.3.....	2.3.....	2.3.....	8.6.....	4.3.....	1.9.....	12.5.....	6.8.....	1.9.....
Band to base.....	1.5.....	1.5.....	1.5.....	1.7.....	1.7.....	1.7.....	1.4.....	1.4.....	1.4.....
Sectional density.....	2.3.....	2.3.....	2.3.....	2.7.....	2.7.....	2.7.....	3.25.....	3.25.....	3.25.....
Primer.....	Threaded obturating friction primer.	Threaded obturating friction primer.	New field-gun friction primer.	Threaded obturating friction primer.	New field-gun friction primer.	Threaded obturating friction primer.			
Powder:									
Kind.....	8. H. siege cannon.....	8. H. siege cannon.....	8. H. siege cannon.....	8. H. siege cannon.....	8. H. siege cannon.....	8. H. siege cannon.....			
Black.....	Black.....	Black.....	Black.....	Black.....	Black.....	Black.....			
Smokeless.....	Smokeless.....	Smokeless.....	Smokeless.....	Smokeless.....	Smokeless.....	Smokeless.....			
Weight:									
Black.....	18 pounds.....	13 pounds.....	13 pounds.....	10.5 pounds.....	10.5 pounds.....	6 pounds.....			
Smokeless.....	4.25 pounds.....	4.25 pounds.....	4.25 pounds.....	8.6 pounds.....	8.6 pounds.....	1.76 pounds.....			
Density of loading:									
Black.....	0.9098.....	0.9098.....	0.9098.....	0.9177.....	0.9177.....	0.9098.....			
Smokeless.....	0.9023.....	0.9023.....	0.9023.....	0.9049.....	0.9049.....	0.9106.....			

Muzzle velocity:	1,880 feet per second..	1,880 feet per second..	1,100 feet per second..	700 foot-seconds..
Black.....	do	do	do	710 foot-seconds..
Smokeless.....	35,000 pounds.....	35,000 pounds.....	28,000 pounds.....	20,000 pounds.....
Maximum pressure per square inch:	80,000 pounds.....	80,000 pounds.....	20,000 pounds.....	17,000 pounds.....
Black.....	1,045 foot-ton.....	1,045 foot-ton.....	881 foot-ton.....	426 foot-ton.....
Smokeless.....	do	do	do	457 foot-ton.....
Muzzle energy:				
Black.....	6.2 inches.....	6.2 inches.....	3.8 inches.....	2.8 inches.....
Smokeless.....	do	do	do	Do.....
Penetration in steel at (De Marre's formula; normal impact):	4.6 inches.....	4.6 inches.....	3.3 inches.....	
Muzzle—	do	do	do	
Black.....	3 inches.....	3 inches.....	2.7 inches.....	
Smokeless.....	do	do	do	
1,000 yards—	2.5 inches.....	2.5 inches.....	2.5 inches.....	
Black.....	do	do	do	
2,500 yards—				
Black.....				
Smokeless.....				
8,500 yards—				
Black.....				
Smokeless.....				

^a From front face of obturator spindle to base of projectile.

^b Without fuse.

^c Gun action.

^d The kind of powder varies with the range.

^e Maximum; the weight of charge varies with the range; for tames in bulk the weight of the charge is assumed to be three-fourths of the maximum.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

DIFFERENCES IN CONSTRUCTION OF SIEGE CARRIAGES.

The following are the essential differences in the construction of the various models of carriages for 5-inch B. L. siege rifle and 7-inch B. L. howitzer:

5-INCH B. L. RIFLE CARRIAGE.

There have been constructed three models of these carriages, model 1892, which takes up the first 20 carriages, model 1896, and model 1896-Modified.

Carriages 1, 3, 11, 16, 17, and 20, of model 1892, have had none of the later modifications made on them. The model 1896 carriages were from 21 to 34, both inclusive, and from 35 to 40, both inclusive, and all later carriages up to No. 70, model 1896-M. Nos. 22, 26, 32, and 34, of the model 1896, have not been brought up to date with all the recent modifications and improvements.

MODEL 1892 CARRIAGE.

Its essential differences from other models.

The model 1892 carriage has not got the screw buffer.

The step plate of the upper step is made of wood instead of steel, as in the later models.

The lower step of the model 1892 carriage is not arranged for tool compartment, therefore has no hinge eye pin and hinge pin key.

It has no wheel guards, no lunette-plate reenforce.

The lash chain eye in the model 1892 carriage, and in all model 1896 and 1896-M carriages up to No. 43, is a part of the lunette plate, instead of being riveted to the plate, as provided in all carriages subsequent to the latter number.

Model 1892 carriage not having a tool box, the trail has no tool-box plate, upper tool-box plate, lower tool-box housing, or pintle thimble.

On this carriage there is no traveling axle bracket, no bolts for same, no yoke suspension bolt, no suspension-bolt pin or split key for same.

The elevating apparatus to this model carriage has but two bevel-gear keys and two bevel-gear key screws.

There is no road brake attached to this carriage; no attachment for rammer staves front and rear, no attachment for roller handspikes front and rear, no attachments for maneuvering handspikes front and rear, and no keys and chains for these.

MODEL 1896 AND 1896-M CARRIAGES.

Their essential differences from other models and each other.

The model 1896 carriage has a tool compartment in the lower step of the trail.

The articles enumerated as not appearing in the model 1892 carriage have all been added to the 1896-M carriages, with the exceptions noted.

The model 1896-M carriage differs from the model 1896 in that the elevating fork has been modified by being made wider and the rear transom correspondingly modified by having the grooves in same widened to admit of the widened elevating fork dropping into same. The rear transom also has a wooden block attached to avoid severe jar on the elevating fork.

In the model 1896-M carriage the crosshead of the elevating mechanism has reverse and horizontal gear plates on the bottom with four keys instead of two as with model 1892 and 1896 carriages. In the model 1896-M carriage the outer elevating screw has also been provided with a stop arrangement to avoid the screw running out. This stop arrangement is effected by not cutting the feather way through the lower thread of the screw.

The model 1896-M carriage has also been provided with a road brake, which has been added to all the model 1892 and 1896 carriages, except as noted.

The rammer staff attachment has been applied to the model 1896-M carriage as well as to the others, but in the former carriage the attachment is somewhat modified.

Wheel guards have also been attached to the model 1896 and 1896-M and model 1892 carriages, except as noted. The wheel guard in the model 1896-M carriage has been changed from that of the model 1896 carriage and model 1892 carriage.

The traveling bracket for hydraulic buffer on the axle in the model 1896-M carriage has been modified from the other brackets, also the bracket on the firing bracket plate.

The gun rest on the front transom for 1896-M carriage has also been modified from those previously constructed. This rest does not appear in the model 1892 carriage at all, except in those carriages that have been modified.

The linch pins and washers for all carriages have also been modified.

In the model 1896-M carriage an eye rivet has been inserted on the under side of upper folding step to hold same in traveling position and takes the place of the eye-bolt in the previous models.

In the model 1896 and 1896-M model carriages the flasks and outside flask trace plates are riveted to the axle plate instead of being bolted as in the model 1892 carriage.

Provision is also made in the model 1896-M carriage to remove the firing bracket pin more readily by putting a hole in the side of the flask through which this can be done.

The model 1896-M carriage has also been provided with a small dirt hole in the lower end of trail.

The front and rear transoms in the model 1896 and 1896-M carriages are riveted instead of being bolted as in the model 1892 carriages. This modification has been made in all the carriages excepting those noted.

The traveling trunnion brackets of carriages are not interchangeable for the different models, and the model and number of carriage for which such bracket is required must be given in the requisition when brackets are required for.

The traveling bracket for the hydraulic buffer and the bracket on firing bracket plate are not interchangeable for the different model carriages; neither is the gun rest on the front transom, and the model of carriages should be given when these items are required for.

The modified linchpin and washers are interchangeable on all vehicles except the ammunition wagon.

None of the later modifications added to this carriage (which are all included in the 1896-M carriage and such of the 1892 and 1896 carriages as have been modified) or any of the parts of such modifications which may be required for repairs, e. g., wheel guards, front or rear, attachments for rammer stave, roller handspike, etc., are interchangeable, and it is absolutely essential in making requisition for such parts to give the model and number of the carriage for which they are required.

7-INCH HOWITZER CARRIAGE.

There have been constructed of this class of carriages three models—model 1893, model 1893-Modified, and model 1899.

The model 1893 carriages remaining unchanged are Nos. 8, 16, and 19.

The model 1893-M carriages not modified are Nos. 22, 26, 28, 29, and 30.

The elevating arc bolts used for bolting elevating arc to the howitzer are used in the model 1898 howitzer only, the arc for the 1890 howitzers being fastened to the howitzer with two studs.

The model 1899 carriage has added to it two axle collars. They are made of steel and attached to the inner shoulder of spindle, acting as a dust guard for the axle.

In the original model of 1893 carriage the flask is only partly flanged at the opening in the side, whereas in the model 1893-M and model 1899 carriages the entire opening is flanged and the middle transom also.

In the first twenty carriages of model 1893 built the outside assembling axle bracket plate does not cover the entire axle and bracket, whereas in all the later models of this carriage it does.

The model 1893-M is supplied with road brake, which is not on the earlier model carriages.

The model 1893-M and model 1899 carriages also have supplied attachments for the maneuvering and roller handspikes and rammer staves which do not appear on the earlier model. The model 1893-M and model 1899 carriages are provided with an arrangement for carrying a tool box on the rear transom not provided in the earlier model.

In the model 1893-M carriage the footplate has been changed from a stationary to a folding hinge plate.

The model 1893-M carriage and all of the model 1899 carriages excepting eight, Nos. 63 to 70, have a gun rest added to the front transom. On the latter carriages of model 1899 the gun rest has been abolished and the transom modified to act as a gun rest.

In the model 1899 carriages one leg of the trunnion box has been taken out, the elevating worm changed from a triple to a single thread, and the elevating sleeve combined.

With reference to the component parts of any of the modified equipment of these carriages the same rule as to the specification of models of guns and parts in making requisition should apply as to the 5-inch guns, none of these parts being interchangeable excepting the linchpins and washers.

The siege-ammunition wagon has 3.2-inch nave boxes. The old steel linchpin and washers are not interchangeable with the new, and in making requisition it should be clearly stated which is required.

Tools, implements, equipments, materials, etc., issued to and carried on forge and battery wagon of a siege battery, 5-inch B. L. rifle or 7-inch B. L. howitzer (in addition to those regularly provided for forge and battery wagon).

	Price each.
On battery wagon:	
18-inch double block	
18-inch single block	
150 feet 3-inch rope (circumference)	

SADDLER'S TOOLS.

The saddler's tools are the same as for a 3.2-inch field battery, and carried in saddler's tool chest in chest compartment.

CARPENTER'S AND WHEELWRIGHT'S TOOLS.

The carpenter's and wheelwright's tools are the same as for a 3.2-inch field battery, and carried in carpenter's tool chest in chest compartment.

Material for cleaning and preservation—on body of forge and battery wagon.

[Expendable.]

	Price each.
4 gallons neatfoot oil	\$0.60
20 pounds harness soap .....	.14
10 pounds sponge	1.50
20 pounds soap, castile .....	.082
3 pounds paraffin wax .....	.05
5 pounds cotton waste .....	.05
24 pints sperm oil .....	.12

Material for cleaning and preservation—on body of forge and battery wagon—Continued.

	Price each.
1 gallon Lebrick's leather oil	\$2.50
1 box leather blacking .....	.18
1 quire sandpaper, No. 24 .....	.12
1 quire sandpaper, No. 14 .....	.12
1 quire sandpaper, No. 4 .....	.12
1 quire sandpaper, No. 00 .....	.12
2 quires emery cloth, No. 90 .....	.42
2 quires emery cloth, No. 120 .....	.42
2 quires emery cloth, No. 00 .....	.42
2 pounds rottenstone .....	.04
3 quires crocus cloth .....	.34
4 quarts cosmic, soft, No. 80 .....	.11
10 pounds puts pomade .....	.25
6 pieces cash cord .....	.81
6 chamols skins .....	.60
1 cleaning box, filled, containing—	
40 ounces scouring material	
16 ounces leather polish	
40 ounces of whiting	
8 pounds of sal soda	
2 chamols skins	
1 wire scratch brush	
4 button sticks	
4 button brushes	
	For prices see page 627.

Supplies—on body of forge and battery wagon.

[Expendable.]

	Price each.
2 sides leather, bridle (24 pounds):	
Black	\$4.68
Fair	5.18
2 sides leather, harness (40 pounds):	
Black	per pound.. .47
Fair	do. .525
2 pounds beeswax .....	.86
8 pounds black wax .....	.10
4 buckles, iron roller, $\frac{1}{2}$ -inch .....	.0075
4 buckles, iron roller, $\frac{1}{2}$ -inch .....	.01
18 buckles, iron roller, $\frac{1}{2}$ -inch .....	.01
4 buckles, iron roller, $\frac{1}{2}$ -inch .....	.01
2 buckles, iron roller, $\frac{1}{2}$ -inch .....	.02
4 buckles, iron roller, $\frac{1}{2}$ -inch .....	.02
4 buckles, brass bar, $\frac{1}{2}$ -inch .....	.084
2 buckles, brass bar, $\frac{1}{2}$ -inch .....	.086
1 buckle, brass bar, Saalbach, $\frac{1}{2}$ -inch .....	.085
3 buckles, brass bar, $\frac{1}{2}$ -inch .....	.04
10 buckles, brass wire, $\frac{1}{2}$ -inch .....	.01
1 buckle, iron bar, $\frac{1}{2}$ -inch .....	.01
6 buckles, iron bar, $\frac{1}{2}$ -inch .....	.02
2 buckles, iron bar, $\frac{1}{2}$ -inch, tongueless .....	.02
2 buckles, iron bar, $\frac{1}{2}$ -inch .....	.02
1 gross saddle nails, japanned	2.25
1 paper tacks, copper, 12-ounce .....	.35
1 paper tacks, copper, 20-ounce .....	.35
1 paper tacks, iron, 8-ounce .....	.084
1 paper tacks, iron, 12-ounce .....	.084
1 paper tacks, iron, 18-ounce .....	.084
1 pound rivets and burrs, brass, $\frac{1}{2}$ -inch, No. 10 .....	.17
1 pound rivets and burrs, brass, $\frac{1}{2}$ -inch, No. 10 .....	.17
1 pound rivets and burrs, brass, $\frac{1}{2}$ -inch, No. 8 .....	.17
2 pounds shoe thread, No. 8 .....	.90
6 pounds shoe thread, No. 10 .....	.90
10 ounces bristles, sewing .....	.82
2 pounds nails (5 pounds 8-penny, 5 pounds 10-penny) .....	.02
1 gross wood screws, iron, $\frac{1}{2}$ -inch, No. 8 .....	.48
3 gallons coal oil .....	.12
2 burners for railroad lantern	per dozen.. .40
6 wicks for railroad lantern	do. .05
26 washers, leather, for wheels	
2 globes, railroad lantern	per dozen.. .75
1 box stencil paste	
Issued by Quartermaster's Department:	
85 pounds bar iron, assorted	
40 pounds tow steel	
250 pounds coal, bituminous	

ADDITIONAL INSTRUMENTS, SPARE IMPLEMENTS, AND EQUIPMENTS.

The following additional instruments, implements, and equipments are issued to a siege battery, either 5-inch rifle or 7-inch howitzer, and carried on army wagons or other conveyance with siege train:

	Price each.
1 picket line, complete, consisting of 9 sections, each.....	\$9.15
6 paulins, 12 by 15 feet.....	11.00
6 trace ropes.....	1.00
3 slush brushes, with handles.....	4.65
8 scrapers, with sockets.....	1.51
2 spare wheels, siege.....	
4 spare wheels, ammunition and platform wagons.....	8.75
4 spare poles.....	7.60
4 doubletrees.....	8.22
4 neck yokes.....	4.37
8 singletrees.....	1.45
4 pole pads.....	1.96
8 linchpins.....	.69
8 linch washers.....	3.70
4 maneuvering handspikes.....	
2 sponge and rammer staves, complete, each consisting of 2 sections:	
5-inch.....	17.11
7-inch.....	14.80
1 fuse "High A" percussion sectional.....	} See page 845 for prices
1 fuse "High C" percussion sectional.....	
1 fuse combination, 15 seconds sectional.....	
1 shrapnel for instruction purposes.....	
1 marking and 1 stencil outfit (see page 637 for prices).....	
1 seal stamp.....	1.12
12 watering buckets, leather.....	5.95
Issued by Signal Corps:	
2 field telephones.....	
2 coils insulated wire.....	
25 dry cells.....	

Six months' allowance of saddlers' materials, materials for cleaning and preservation, paints, etc., for one battery of siege artillery.

[All articles under this heading are expendable.]

	Price each.
Materials for cleaning and preservation:	
12 silk wipers.....	\$0.25
3 pieces sash cord.....	.51
2 pieces hemp cord, 1/4-inch diameter (for fastening cover on store wagon).....	
1 quire sandpaper, No. 24.....	.12
1 quire sandpaper, No. 14.....	.12
1 quire sandpaper, No. 10.....	.12
1 quire sandpaper, No. 00.....	.12
5 quires crocus cloth.....	.84
2 quires emery cloth, No. 90.....	.42
2 quires emery cloth, No. 120.....	.42
2 quires emery cloth, No. 00.....	.42
12 pounds Putz pomade.....	.25
4 pounds rotten stone.....	.04
50 papers tripoli.....	.08
20 pounds harness soap.....	.14
50 pounds castile soap.....	.03
10 quarts crown soap.....	
5 pounds borax.....	.09
25 pounds cotton waste.....	.05
10 pounds sponge.....	1.50
1 box cleaning material, containing—	
40 ounces scouring material.....	} For price, see page 627.
16 ounces leather polish.....	
40 ounces whiting.....	
8 pounds sal soda.....	
2 chamols skins.....	
1 wire scratch brush.....	
4 button brushes.....	
4 button sticks.....	
6 quarts Cosmic, No. 80, soft.....	.11
20 gallons neatfoot oil.....	.60
2 gallons sperm oil.....	.95
1 pint linseed oil, raw.....	.06
50 pounds axle grease.....	.04

Six months' allowance of saddlers' materials, etc.—Continued.

	Price each.
Paints, etc.:	
26 pounds paint, lead-colored, quick drying.....	\$0.11
26 pounds paint, black, quick drying.....	.29
76 pounds paint, olive, quick drying.....	.18
2 pounds paint, first coat for guns.....	.12
2 pounds paint, second coat for guns.....	.14
4 gallons linseed oil, boiled.....	.68
3 gallons spirits turpentine.....	.68
2 paint brushes, No. 3-0.....	.50
2 paint brushes, No. 4-0.....	.50
2 paint brushes, No. 6-0.....	.50
2 sash tools, No. 2.....	.02
2 sash tools, No. 3.....	.02
2 pounds paint, black, for steel horse collars.....	.14
Saddlers' materials:	
8 pounds shoe thread, No. 3.....	.90
8 pounds shoe thread, No. 10.....	.90
1 pound linen thread, No. 18.....	.98
24 yards red linen webbing, $\frac{3}{4}$ inches wide.....	.064
1 pound rivets and burrs, brass, $\frac{1}{4}$ -inch, No. 10.....	.17
8 pounds rivets and burrs, brass, $\frac{1}{4}$ -inch, No. 10.....	.17
1 pound rivets and burrs, brass, $\frac{1}{4}$ -inch, No. 8.....	.17
1 pound rivets and burrs, brass, $\frac{1}{4}$ -inch, No. 12.....	.17
1 gross brass screws, $\frac{1}{4}$ -inch, No. 6.....	.98
1 gross iron screws, $\frac{1}{4}$ -inch, No. 8.....	.24
12 buckles, iron roller, $\frac{1}{4}$ -inch.....	.0075
12 buckles, iron roller, $\frac{1}{2}$ -inch.....	.01
18 buckles, iron roller, $\frac{1}{4}$ -inch.....	.01
12 buckles, iron roller, $\frac{1}{2}$ -inch.....	.01
12 buckles, iron roller, $\frac{1}{4}$ -inch.....	.02
20 buckles, iron roller, $\frac{1}{4}$ -inch.....	.02
12 buckles, brass bar, $\frac{1}{4}$ -inch.....	.088
6 buckles, brass bar, $\frac{1}{4}$ -inch.....	.085
2 buckles, brass bar, Sealbach, $\frac{1}{4}$ -inch.....	.088
6 buckles, brass bar, $\frac{1}{4}$ -inch.....	.04
24 buckles, brass wire, $\frac{1}{4}$ -inch.....	.01
6 buckles, iron bar, $\frac{1}{4}$ -inch.....	.01
24 buckles, iron bar, $\frac{1}{4}$ -inch.....	.02
12 buckles, iron bar, $\frac{1}{4}$ -inch, tongueless.....	.02
12 buckles, iron bar, $\frac{1}{4}$ -inch.....	.02
12 iron rings, $\frac{1}{4}$ -inch.....	.01
12 iron rings, $\frac{1}{4}$ -inch.....	.01
12 iron rings, $\frac{1}{4}$ -inch.....	.01
12 iron rings, $\frac{1}{4}$ -inch.....	.11
4 brass rings, $\frac{1}{4}$ -inch.....	.08
12 halter squares.....	.02
12 halter bolts.....	.01
12 halter swivel rings.....	.0825
6 covert snaps, $\frac{1}{4}$ -inch.....	.07
6 iron hooks for breast straps.....	.51
6 iron hooks for back straps.....	.25
6 iron hooks for side straps of breeching.....	.51
6 iron lead rein rollers.....	.26
4 brass foot staples, high.....	.02
4 brass foot staples, low.....	.02
4 brass foot staples, semicircular.....	.02
24 brass-wire double hooks.....	.09
24 brass-wire end hooks.....	.017
24 brass-wire squares, $\frac{1}{4}$ -inch.....	.01
12 brass-wire loops, $\frac{1}{4}$ -inch.....	.015
12 brass-wire D rings.....	.012
8 iron foot staples, high.....	.01
8 iron foot staples, low.....	.01
8 iron foot staples, semicircular.....	.01
72 saddle nails, japanned, per gross.....	2.25
2 papers tacks, iron, 6-ounce.....	.085
1 paper tacks, iron, 8-ounce.....	.085
2 papers tacks, iron, 12-ounce.....	.085
1 paper tacks, iron, 18-ounce.....	.085
1 paper tacks, copper, 12-ounce.....	.35
1 paper tacks, copper, 20-ounce.....	.35
15 ovals, for saddles.....	.01
1 gross brass screw pins, $\frac{1}{4}$ -inch (per gross).....	2.25
4 lariat snap hooks.....	.05
4 lariat strap snap hooks.....	.05
4 link strap hooks.....	.05
4 saddlebag studs.....	.05
2 saddle shields, $11\frac{1}{2}$ -inch.....	.01
6 saddle shields, $11\frac{1}{2}$ -inch.....	.01
4 saddle shields, 12-inch.....	.01
4 bridle ornaments, brass.....	.04

Six months' allowance of saddler's materials, etc.—Continued.

	Price each.
Saddler's materials—Continued.	
150 pounds leather, harness, per pound:	\$0.47
Black.....	.525
Fair.....	
5 sides leather, bridle:	
4 Black.....	4.68
1 Fair.....	5.18
3 sides rawhide.....	1.85
1 pound beeswax.....	.36
4 pounds brown wax.....	.06
2 pounds black wax, summer or winter prepared.....	.10
4 gallons harness oil.....	1.04
4 gallons Lebrick's leather oil.....	2.60
2 boxes leather blacking.....	.18
20 awls, stitching, assorted.....	.06
6 awl handles, plain.....	.17
1 paper needles, harness, No. 5.....	.0525
1 paper needles, harness, No. 6.....	.0525
1 paper needles, gloves's, No. 8.....	.065
2 needles, collar, No. 4.....	.11
2 needles, collar, No. 44.....	.11
3 thimbles.....	.10
2 ounces bristles.....	
Miscellaneous material:	
2 burners for railroad lanterns.....	per dozen.. .40
5 wicks for railroad lanterns.....	do..... .06
1 box stencil paste.....	
25 washers (leather) for wheels.....	
2 globes for railroad lanterns.....	per dozen.. .75

NOTE.—The list of supplies assumes the battery to be equipped with black leather harness and russet leather equipments. Where batteries are supplied with russet leather harness, those articles pertaining to the black leather harness should be omitted and the same amounts of corresponding articles for russet harness should be requested.

The cleaning and saddlers' materials given on pages 446–447, as contained in forge and battery wagon of siege battery, will not be considered as a part of the six months' allowance when making requisition for supplies given on pages 448–450.

The former, or an equal quantity, is intended to be at all times kept in the forge and battery wagon. That is to say, the forge and battery wagon should at all times remain completely charged with its entire equipment ready for immediate field service.

In making requisition for saddlers' cleaning or other materials the amount on hand, of each kind required for, must always be given before the requisition will receive consideration.

If materials are required for in excess of the allowance given in the tables herein, the special necessity for same should be fully set forth in the requisition.

No expendable stores must be dropped on property returns until actually used in the service.

Implements, equipments, parts of harness, etc., needed to replace those unserviceable and not expendable, will be issued as required after submission to inspection according to regulations.

With each siege carriage one breech strap (price \$0.97) is issued as a part of the carriage. Separate straps are supplied on requisition when required.

Cans containing oil, cleaning materials, paints, etc., used for shipping these articles (when required for to fill the cans provided in the compartments of equipment of siege battery), are not part of the equipment, and are not invoiced, and should not be taken up on property returns.

Coal oil is issued by the Ordnance Department only for use in the lanterns forming part of the battery equipment, and for cleaning light slushing oil from bore of guns.

Collar pads are only issued when specifically called for.

Cosmic, No. 80, soft, is supplied instead of vaseline for use in the preservation from rust of the bright surfaces of siege guns and carriages.

The pole, doubletrees, singletrees, and neck yokes for the siege limber and ammunition wagon are interchangeable. The forge and battery wagon is supplied with the light-battery pattern of both.

Halters for mules are not supplied by the Ordnance Department.

Mule harness (except for pack outfits) is not issued by the Ordnance Department.

The brass lantern with the Cranston attachment is no longer issued. Railroad lanterns are issued instead.

Mogul (trace) springs are issued in two sizes for siege artillery harness, viz, 320 pounds for use on the wheel traces and 200 pounds for use on all other traces.

Horse equipments issued for use of siege batteries are the same as those issued for light batteries. (For list of parts, etc., see p. 519-520.)

BLACKSMITH'S TOOLS (FORGE CHEST).

The blacksmith's tools are the same as for a 3.2-inch field battery, and carried in forge chest on limbers of forge and battery wagon.

Tools and implements—on body of battery wagon.

7-inch howitzer.	Price each.	5-inch rifle.	Price each.
3 gunner's gimlets	\$1.35	3 gunner's gimlets	\$1.35
3 vent punches	1.50	3 vent punches	2.00
3 priming wires .....	.90	3 priming wires .....	.90
2 sponge heads	4.88	2 sponge heads, chamber ^a	4.28
4 sponges	5.10	1 sponge head, bore ^a	8.82
1 rammer head ^a	3.40	2 sponges, chamber ^a .....	.91
4 fuse punches .....	.15	1 rammer head ^a	5.10
24 fuse punch pins	5.00	4 fuse punches	3.40
2 primer keys	2.80	24 fuse punch pins .....	.15
8 whips, artillery .....	.14	2 primer keys	5.00
2 pickax handles ^a .....	.12	8 whips, artillery	2.80
2 ax helves ^a .....	.84	2 pickax handles ^a .....	.14
2 lanyards, siege ^a		2 ax helves ^a .....	.12
		2 lanyards, siege ^a .....	.84

^a Expendable.

Spare parts harness and collar—on body of battery wagon.

	Price each.
Harness:	
6 breast straps	\$1.25
6 bridles and bits, artillery:	
3 near horse	4.87
3 off horse	5.12
6 bridles, watering	1.33
4 collars, steel	9.00
8 girths, artillery—4 wheel, \$1.54 each; 4 lead, \$1.22 each	
6 halter headstalls	1.43
56 halter straps ^a .....	.42
6 martingales with girth straps	2.47
2 neckyoke pads ^a .....	.36
10 surcingles, Nos. 1, 2, and 3, as called for ^a .....	.68
4 traces, lead, modified for siege harness	4.47
4 traces, wheel	3.74
4 nose bags	1.04
6 side straps to breeching .....	.585
9 stirrup straps .....	.50
4 trace springs (mogul), 320 pounds	4.00
4 trace springs (mogul), 200 pounds	4.00
Steel collars—all expendable:	
2 trace plates .....	.60
4 draft springs .....	.30
4 pad hooks .....	.18
2 pad bolts and nuts .....	.01
2 nuts for pad bolts .....	.01
2 buckle latches .....	.07
6 buckle springs .....	.01
6 bolts and nuts for top connection .....	.04

^a Expendable.

Spare parts harness and collar—on body of battery wagon—Continued.

	Price each.
Steel collars—all expendable—Continued.	
4 nuts for top-connection bolts.....	\$0.02
6 bolts and nuts for bottom of collar.....	.04
4 nuts for bottom bolts.....	.01
6 bolts and nuts for extension.....	.04
4 nuts for extension bolts.....	.01
6 bolts and nuts for trace plates.....	.04
4 nuts for trace-plate bolts.....	.01
12 back straps with hooks.....	.70
6 back-strap hooks.....	.15
8 back-strap connections.....	.30
6 collar pads, canvas.....	1.52

The nave boxes and nave box flange bolts, etc., are interchangeable for all the vehicles supplied by the Ordnance Department to a siege battery.

Pole and neck-yoke pads are fitted on all neck yokes issued. Extra parts are supplied as required.

Hydrolene oil is issued for use in hydraulic cylinders of siege carriages to take the place of neutral oil heretofore issued.

Copper rivets and burrs are no longer issued.

Silk wipers when soiled should be washed. Instructions for washing will be found in each tool box.

Sperm oil only should be used as a lubricant for the mechanism of the gun and carriage.

Sponge heads with woolen sponges attached do not form part of sponge and rammer staves, but are issued separately.

The "siege wheels" are used on the siege limbers and carriages; the "ammunition and platform wheels" on the ammunition and platform wagons; the "light artillery limber wheel" on the forge and battery wagon.

The supply of ammunition to be kept on hand in a siege battery equipped with either 5-inch siege rifles, 7-inch howitzers, or 7-inch mortars will be a sufficient quantity to fill all the ammunition wagons comprising the regular equipment of the battery and in addition a sufficient number of rounds to cover the needs for the annual target practice.

PERSONAL EQUIPMENT BATTERY OF SIEGE ARTILLERY.

All enlisted men of a siege battery should be armed with revolvers, wear leggings for mounted duty and be provided with regulation mess and camp outfit.

The following enlisted men should be armed with saber (G. O. 134, also 1901):

- 1 first sergeant.
- 1 quartermaster-sergeant.
- 1 stable sergeant.
- 6 sergeants (chief of section).
- 12 corporals (caisson corporals).
- 2 trumpeters.
- 1 guidon.
- 4 artificers.

PERSONNEL EQUIPMENT OF SIEGE BATTERY.

The equipment of siege artillery soldier, excepting noncommissioned officer, driver, and cannoneer, is as follows:

	Price each.	
	Black leather.	Fair leather.
1 revolver, caliber .38.....	\$11.00	\$11.00
1 revolver holster, caliber .38.....	.88	.96
1 revolver cartridge belt, caliber .38, woven (with ring for saber attachment).....	1.00	1.00
1 waist belt, leather.....	.42	.50
1 waist-belt plate ^a.....	.22	.22
1 cartridge box, revolver, leather.....	.57	.59
1 canteen.....	.33	.38
1 haversack.....	.85	.85
2 canteen haversack straps.....	.52	.69
1 artillery knapsack.....	4.00	4.00
1 meat can.....	.19	.19
1 tin cup.....	.10	.10
1 knife.....	.04	.04
1 fork.....	.04	.04
1 spoon.....	.02	.02
Total.....	20.18	20.42

^a If buckle is used, cost of same is 10 cents.

Equipment of noncommissioned officer of siege battery is as follows:

	Price each.	
	Black leather.	Fair leather.
1 revolver, caliber .38.....	\$11.00	\$11.00
1 revolver holster, caliber .38.....	.88	.96
1 revolver cartridge belt, caliber .38, woven (with ring for saber attachment).....	1.00	1.00
1 waist belt, leather.....	.42	.50
1 waist-belt plate ^a.....	.22	.22
1 saber-belt slide and hook.....	.11	.11
1 saber attachment.....	1.29	1.29
2 saber attachment slings.....		
1 cartridge box, revolver, leather.....	.57	5.91
1 saber (light cavalry).....	6.00	6.00
1 saber knot.....	.52	.50
1 pair saddlebags.....	5.06	5.90
1 pair spurs.....	.37	.37
1 pair spur straps.....	.11	.14
1 curb bridle, complete.....	4.00	4.80
1 currycomb.....	.22	.22
1 horse brush.....	.97	.97
1 link.....	.28	.30
1 canteen strap, cavalry.....	.21	.25
1 canteen haversack strap.....	.62	.69
1 saddle cover, duck.....	.95	.95
1 saddle, complete.....	14.31	16.26
1 canteen.....	.38	.33
1 meat can.....	.19	.19
1 tin cup.....	.10	.10
1 knife.....	.04	.04
1 fork.....	.04	.04
1 spoon.....	.02	.02
Total.....	49.82	52.18

^a If buckle is used, cost of same is 10 cents.

Equipment of each driver is as follows:

	Price each.	
	Black leather.	Fair leather.
1 revolver, caliber .38.....	\$11.00	\$11.00
1 revolver holster, caliber .38.....	.83	.96
1 revolver cartridge belt, caliber .38, woven (with ring for saber attachment).....	1.00	1.00
1 waist belt, leather.....	.42	.50
1 waist-belt plate.....	.22	.22
1 cartridge box, revolver, leather.....	.67	.69
1 pair saddlebags.....	5.06	5.90
1 pair spurs.....	.87	.87
1 pair spur straps.....	.11	.14
1 currycomb.....	.22	.22
1 horse brush.....	.97	.97
1 canteen strap, cavalry.....	.21	.25
1 canteen.....	.83	.83
1 meat can.....	.19	.19
1 tin cup.....	.10	.10
1 knife.....	.04	.04
1 fork.....	.04	.04
1 spoon.....	.02	.02
Total.....	21.69	22.88

Equipment of each cannoneer is as follows:

	Price each.	
	Black leather.	Fair leather.
1 revolver, caliber .38.....	\$11.00	\$11.00
1 revolver holster, caliber .38.....	.83	.96
1 revolver cartridge belt, caliber .38, woven (with ring for saber attachment).....	1.00	1.00
1 waist belt, leather.....	.42	.50
1 waist-belt plate.....	.22	.22
1 cartridge box, revolver, leather.....	.67	.69
1 canteen.....	.83	.83
1 haversack.....	.86	.86
2 canteen haversack straps.....	.62	.69
1 blanket roll strap.....		
1 meat can.....	.19	.19
1 tin cup.....	.10	.10
1 knife.....	.04	.04
1 fork.....	.04	.04
1 spoon.....	.02	.02
Total.....		
For each horse, except officers' and spare horses.....		
1 saddle blanket.....	2.70	2.70
1 watering bridle.....	1.18	1.33
1 halter headstall.....	1.55	1.89
1 halter strap.....	.41	.49
1 lariat.....	.78	.78
1 nosebag.....	.96	1.04
1 picket pin.....	.36	.36
1 sureingle.....	.69	.86
Total.....		
For each battery as part of original equipment:		
1 stirrup with hood and socket for guidon.....	1.60	1.86
30 cinchas, extra.....	1.81	1.48

For list of component parts of equipments, see pages 638 and 639.

CLEANING MATERIAL FOR PERSONNEL EQUIPMENT.

Cleaning materials for the personnel of a siege battery are of the same description as those issued to the infantry. (The allowance per battery is "4 boxes of cleaning materials" per annum. For list of contents, see p. 627.)

Marking and stencil outfits for siege batteries are of the same pattern as those issued to the infantry. (See p. 637 for components, etc.)

Arm racks for revolvers are issued to siege batteries in sufficient quantities to hold all the revolvers of the battery equipment. (For component parts of rack, see p. 642-643.)

CHAPTER XIV.

FIELD AND MOUNTAIN ARTILLERY MATERIAL.

3.2-INCH B. L. RIFLE FIELD BATTERY.

For complete details as to care, instructions for preservation, etc., see pamphlet issued by Ordnance Department, "Handbook of Material for 3.2-inch Field Battery."

The equipment of a 3.2-inch field battery consists of six 3.2-inch B. L. rifles, carriages, and limbers drawn by six horses, nine caissons drawn by six horses, one forge and battery wagon drawn by six horses, and one artillery store wagon drawn by four horses. The harness required to equip the battery is 17 sets of wheel harness and 34 sets of lead harness for two horses, and 51 harness sacks.

The 3.2-inch B. L. rifles, model 1885, are in service with State militia, colleges, and some few at posts for saluting purposes.

The 3.2-inch B. L. rifles, model 1890 and 1890 M, converted, and model 1897, are in use in the regular service, and some few of them have been issued to State troops.

Weight, dimensions, etc., of 3.2-inch B. L. rifle, model 1885.

Weight, 829 pounds.

Distance between rimbaes, 9.5 inches.

Length of trunnions, 2.25 inches.

Distance of axis of trunnions from muzzle, 57.719 inches.

Total length, 90.62 inches.

Length of bore, 80 inches.

Maximum diameter of breech, 9.56 inches.

Diameter of muzzle, 5.1 inches.

Diameter of trunnions, 3.8 inches.

Powder chamber:

Diameter, 3.8 inches (maximum).

Length, 5.58 inches.

Capacity, 50 cubic inches.

Travel of projectiles in bore 22.4971 caliber, 71.991 inches.

Projectile:

Kind.	C. I. shell.	Shrapnel.
Weight (filled) pounds..	134	134
Ratio of weight to weight of piece.....	7	3.5
Weight of bursting charge, rifle powder..... ounces..	8	2.4
Length caliber..	1.68	1.68
Sectional density $\frac{W}{A}$	\$1.60	\$2.60
Price.....		

* Without fuse.

Powder:

Kind, sphero-hexagonal and smokeless.

Weight—

Sphero-hexagonal, 3.5 pounds for cast-iron shell; 3.5 pounds for shrapnel.

Smokeless, 18.75 ounces for cast-iron shell; 18.75 ounces for shrapnel.

Density of loading—

Sphero-hexagonal, 0.8832 for cast-iron shell; 0.8783 for shrapnel.

Smokeless, 0.2952 for cast-iron shell; 0.2936 for shrapnel.

Muzzle velocity:

Sphero-hexagonal, 1,685 feet per second for cast-iron shell; 1,685 foot-seconds for shrapnel.

Smokeless, 1,685 feet per second for cast-iron shell; 1,685 foot-seconds for shrapnel.

Maximum pressure per square inch:

Sphero-hexagonal, 35,000 pounds.

Smokeless, 35,000 pounds.

Penetration in steel (De Marre formula, normal impact) at—**Muzzle—**

Sphero-hexagonal, 3.8 inches.

Smokeless, 3.8 inches.

Muzzle energy:

Sphero-hexagonal, 266 foot-tons.

Smokeless, 266 foot-tons.

Rifling:

Number of grooves, 24.

Width of groove, 0.3 inch.

Depth of grooves, 0.05 inch.

Width of lands, 0.1188 inch.

Twist of rifling, one turn in 30 calibers at origin, increasing to one turn in 25 calibers at 24 inches from muzzle, being uniform over the 24 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

3.2-INCH B. L. RIFLE, MODEL 1885.

This model is issued to militia and colleges only. None in the regular service.

The designation "one 3.2-inch B. L. rifle, model 1885" in correspondence, invoices, receipts, requisitions, etc., comprises the gun proper, with its attached parts, and breech mechanism complete, as per list below. This model of gun is not fitted for the telescopic sight. In filling a requisition for a gun of this model it is customary to issue thereon the following articles, which are mentioned in the invoices: One rear sight (tangent); one rear-sight pouch; one front sight (tangent); one front-sight cover. (Par. II, Ord. Dept., No. 41, s. 1885.):

List of parts in "one breech mechanism, complete," for 3.2-inch B. L. rifle, model 1885.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One block carrier, complete:					
Hinge pin	1	Steel....	Hinges block carriers to gun.	Interchangeable all 3.2-inch guns.	
Hinge-pin screws...	2	....do...	Secure hinge pin in block carrier.	....do.....	
Block carrier.....	1	....do...	Encircles breechblock.	Interchangeable all guns this model.	Carrier ring.
Block stop.....	1	....do...	Through block carrier near hinge; governs motion of block in carrier.	Requires careful fitting to individual block carrier.	Stop bolt, guide bolt, stop.
Block-stop screw...	1	....do...	Secures stop bolt.....	Interchangeable all 3.2-inch guns.	Stop-bolt screw, stop screw.
Carrier latch bolt...	1	Norway iron.	In latch recess in block carrier.	Interchangeable all guns this model.	Latch, latch pin, latch bolt.
Carrier latch spring	1	Steel....	Behind latch bolt in latch recess.	Interchangeable all 3.2-inch guns.	
Carrier latch cover.	1	....do...	Covers latch recess in block carrier (opposite hinge).	Interchangeable all guns this model.	Latch housing.
Carrier latch screws	2	....do...	Secure latch cover to block carrier.	Interchangeable all 3.2-inch guns.	Latch-cover screws, latch-housing screws.
One breechblock, complete:					
Breechblock	1	....do...	In breech of gun, secured to block carrier by stop (and when open by latch bolt).	Interchangeable all guns this model.	Breech plug, breech screw.
Block handle.....	1	Bronze.	Rear-end of breechblock.	Interchangeable all 3.2-inch guns.	Handle.
Block-handle screws	2	Steel....	In handle	As issued fit any gun if removed can not be used again, account of fit.	Handle screws.
Block lever.....	1	....do...	Rear-end breechblock in lugs.	Interchangeable all guns this model.	Lever, lever handle, rotating lever.
Block-lever pivot...	1	....do...	Through block lever and lugs on breechblock.	Interchangeable all 3.2-inch guns.	Lever (or lever-handle) pin.
Block-lever screw...	1	....do...	Through block lever into pivot.	....do.....	Lever-handle set screw.
Lengthening disk (used in Watertown Arsenal and West Point Foundry gun only).	1	....do...	Between breechblock and gas-check cup.	Interchangeable all guns this model having disk.	
One obturator, complete:					
Obturator spindle, complete—					
Obturator spindle	1	....do...	Through center bore of breechblock.	Spindle and nut not issued separately, account spline screw seat. Spindle and nut fit any gun this model.	Obturator, mushroom head and spindle. (The term "obturator" should never be used for "obturator spindle").
Obturator nut....	1	....do...	Rear and spindle.....		Obturator nut.
Obturator spline screw.	1	....do...	Between spindle and nut.	Interchangeable; all 3.2-inch spindles.	Obturator nut spline screw, spindle spline screw.
Obturator spring...	1	....do...	On spindle in front of nut.	Interchangeable all guns this model.	Spindle spring.
Rear gas-check cup.	1	....do...	On spindle between block and pad.	....do.....	Rear cup.
Front gas-check pad	1	....do...	On spindle between pad and head of spindle.	....do.....	Front cup.
Gas-check pad.....	1	Asbestos and talc—low in salivars cover.	On spindle between cups.	....do.....	Pad; gas check.

List of parts in "one breech mechanism, complete," for 3.2-inch B. L. rifle, model 1886—
Continued.

PARTS ATTACHED TO GUN BODY, BUT REMOVABLE.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Retracting stud	1	Steel ...	Recess at breech for block carrier. (Screws in R. H. thread.)	Interchangeable all guns this model.	Operating stud, latch stud, conical stud.
Rear-sight socket.....	1	....do....	In dovetailed slot, right side breech.	Not to be removed unless broken. Must be filed to a close fit.	Sight socket.
Rear-sight socket screw.....	1	....do....	In sight socket	Not to be removed..	
Vent bushing	1	Copper ..	In vent.....	Not interchangeable. ^a	
Vent cover	1	Steel ...	In vent-cover shield...	Interchangeable all guns this model.	
Vent-cover shield	1	....do....	Over vent cover.....	do	
Vent-cover screws.....	8	....do....	In vent-cover shield...	do	

^a Bushings can be issued to go into any gun of this model, but hole for end of vent cover can not be correctly placed until tried in individual gun.

Price of gun, \$1,022.

3.2-INCH B. L. RIFLES, MODELS 1890, 1890 M, AND 1890 M1.

The guns originally of these models (as will be seen by the table, page —) have been converted to the model 1897, except gun No. 49, model 1890, W. A., which is in use by the Ordnance Department and will be converted later; and gun No. 63, model 1890 M, W. A., which is a smokeless-powder gun with model 1897 powder chamber. The breech mechanism of model 1890 M is identical with that of the model 1897. The list of parts for the model 1897 therefore answers for the model 1890 M. Price of gun, \$1,022.

Weights, dimensions, etc., of 3.2-inch B. L. Rifle, model 1897.

Weight, 830 pounds.

Distance between rimbases, 9.5 inches.

Length of trunnions, 2.7 inches.

Distance of axis of trunnions from muzzle, 57.35 inches.

Total length, 7.31 feet.

Length of bore, 25.2 calibers.

Maximum diameter, breech, 9 inches.

Diameter of muzzle, 5 inches.

Diameter of trunnions, 3.8 inches.

Powder chamber:

Diameter, 3.32 inches.

Length, 5.58 inches.

Capacity, 50 cubic inches.

Travel of projectiles in bore 23.4531 calibers, 75.05 inches.

Projectile:

Kind.	C. I. shell.	Shrapnel.
Weight (filled).....pounds..	13.5	13.5
Ratio of weight to weight of piece.....	$\frac{7}{16}$	$\frac{3}{8}$
Weight of bursting charge, rifle powder.....ounces..	7	3.5
Length, calibers ^a	3	2.4
Sectional density $\frac{W}{V^2}$	1.68	1.68
Price.....	\$1.50	\$2.00

^a Without fuse.

Powder:

Kind, smokeless.

Weight, 15.25 ounces.

Density of loading, 0.5276.

Muzzle velocity, smokeless powder, 1,685 feet per second.

Maximum pressure per square inch, smokeless powder, 35,000 pounds.

Smokeless powder.

Penetration in steel at (De Marre formula, normal impact)—

Muzzle, 3.8 inches.

Muzzle energy, smokeless powder, 286 foot-tons.

Rifling:

Number of grooves, 24.

Width of grooves, 0.3 inch.

Depth of grooves, 0.04 inch.

Width of lands, 0.1188 inch.

Twist of rifling, one turn in 50 calibers at origin, increasing to one turn in 25 calibers at 4.8 inches from muzzle, being uniform over the 4.8 inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges.

3.2-INCH B. L. RIFLE, MODEL 1897.

The designation, "one 3.2-inch B. L. rifle, model 1897," in correspondence, invoices, receipts, requisitions, etc., comprises the gun proper, with its attached parts and breech mechanism complete, as per list below.

In filling a requisition for a gun of this model it is customary to issue thereon the following articles, which are mentioned in the invoice: One rear sight (tangent), one rear-sight pouch, one front sight (tangent) with screws (4), one front-sight cover, one telescopic sight (and one telescopic sight case, not invoiced). (Par. II, Ord. Ord. No. 41, s. 1885.)

List of parts in "one breech mechanism, complete," for 3.2-inch B. L. rifle, model 1897.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One block carrier, complete:					
Hinge pin	1	Steel....	Hinges block carrier to gun.	Interchangeable all 3.2-inch guns.	
Hinge-pin screws...	2	....do...	Secure hinge pin to block carrier.	....do	
Block carrier.....	1	....do...	Encircles breechblock.	Interchangeable all guns this model.	Carrier ring.
Block stop.....	1	....do...	Through block carrier near hinge. Governs motion of breechblock in carrier.	Requires careful fitting to individual block carrier.	Guide bolt; stop bolt.
Block-stop screw ...	1	....do...	Secures stop bolt	Interchangeable all 3.2-inch guns.	Stop-bolt screw.
Carrier-latch bolt ..	1	Norway iron.	In latch recess in block carrier.	Interchangeable all 3.2-inch guns, except model 1895.	Latch, latch-pin, latch-bolt.
Carrier-latch spring	1	Steel....	Behind latch bolt in latch recess.	Interchangeable all 3.2-inch guns.	
Carrier-latch cover ..	1	....do...	Covers latch recess in block carrier (opposite hinge).	Interchangeable all guns this model.	
Carrier-latch screws	2	....do...	Secure latch cover to block carrier.	Interchangeable all 3.2-inch guns.	
One breechblock, complete:					
Breechblock.....	1	....do...	In breech of gun, secured to block carrier by block stop, and when breech open, by latch bolt.	Interchangeable all guns this model.	

List of parts in "one breech mechanism, complete," for 3.2-inch B. L. rifle, model 1897—
Continued.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One breech block, complete—Cont'd.					
Vent cover	1	Steel....	Slides in rear of breechblock.	Interchangeable all 3.2-inch guns, except model 1886.	Guideway cover.
Vent-cover stud	1	....do....	Screwed into end of vent cover.	Not to be removed from vent cover.	
Vent-cover housing ..	1	....do....	Covers vent-cover seat in breechblock.	Not interchangeable, account of seat for screw.	
Vent-cover screw....	1	....do....	Secures vent-cover housing to breechblock.	Interchangeable all 3.2-inch guns, except model 1886.	
Block handle.....	1	Bronze ..	Rear end breechblock.	Interchangeable all 3.2-inch guns.	
Block-handle screws.	2	Steel....	In handle	As issued fit any 3.2-inch gun; if removed can not be used again account of fit.	
Block lever.....	1	....do....	Rear end breechblock in lugs.	Interchangeable all 3.2-inch guns except model 1886.	Rotating lever, lever, lever handle.
Block-lever pivot....	1	....do....	Through lever and lugs on breechblock.	Interchangeable all 3.2-inch guns.	Lever (or lever handle) pin.
Block-lever screw ..	1	....do....	Through lever and pivot.	....do	
One obturator, complete:					
Obturator spindle, complete.					
Obturator spindle ..	1	....do....	Through center bore of breechblock.	Spindle and nut not issued separately, account of spline-screw seat; spindle and nut, however, fit any model 1897 gun.	Spindle, obturator, mushroom head and spindle. (The term "obturator" should never be used for "obturator spindle.")
Vent bushing	1	Copper ..	Through center of obturator spindle.	Interchangeable; screwed in and riveted.	
Obturator nut.....	1	Steel....	Rear end of spindle.		Spindle nut.
Obturator-spline screw.	1	....do....	Halved in spindle and nut.	Interchangeable all 3.2-inch guns.	
Obturator spring	1	....do....	On spindle in front of nut.	Interchangeable all 3.2-inch guns except model 1886.	Spindle spring.
Front split ring	1	....do....	On spindle between pad and head of spindle.	Interchangeable all guns this model.	
Rear split ring	1	....do....	On spindle between pad and gas-check disk.	....do	

PARTS ATTACHED TO GUN BODY, BUT REMOVABLE.

Retracting stud	1	Steel....	Recess for block carrier (operates latch).	Interchangeable ...	Operating stud, latch stud, conical stud. Sight socket.
Rear-sight socket.....	1	....do....	In dovetail slot, right-side breech.	Not to be removed unless broken. Must be filed to a close fit.	
Rear-sight socket screw.	1	....do....	Riveted in sight socket.	.....
Telescopic sight bracket.	1	Bronze ..	Right trunnion.....	(See note).....	
Telescopic sight bracket screws. ^a	{ 1 or 3 }	Steel....	.....	

^aTwo kinds. Old form had 3 screws; new has dovetailed slot and only 1 screw. In making requisition for bracket, state for which form the gun is fitted. All guns will be so slotted as soon as they can be spared from service. The screws for the two forms of bracket are of different dimensions, and requisitions for screws must state the kind of bracket for which required.

Price of 3.2-inch gun, \$1,022.

SPARE PARTS OF GUN, 3.2-INCH B. L. RIFLE.

The following spare parts are issued for the 3.2-inch B. L. rifle, and carried in forge and battery wagon, to wit:

[Estimated one year's supply.]

	Price each.
6 obturator spindles.....	\$9.00
4 carrier-latch bolts.....	1.95
8 carrier-latch springs.....	.65
3 gas-check pads.....	2.00
2 split rings, front, steel.....	5.00
2 split rings, rear, steel.....	5.00
2 small split rings.....	2.00
4 vent bushings, copper.....	6.00

^a Expendable.

NOTE.—The latest model vent bushing is threaded at both ends to prevent blowing out.

The following spare parts for breech mechanism of 3.2-inch B. L. rifle are kept on hand at arsenals and will be issued from time to time, as required:

Part.	Price each.	Part.	Price each.
Hinge-pin screws.....	\$0.25	Block handles.....	\$5.00
Block stops.....	4.00	Block-handle screws.....	.50
Block stop-screws.....	.25	Block-lever.....	2.00
Carrier-latch covers.....	5.00	Block-lever pivot.....	3.50
Carrier-latch cover screws.....	.65	Block-lever screws.....	.32
Vent covers.....	4.20	Obturator nuts.....	1.50
Vent-cover housings.....	4.20	Obturator spline screws.....	.25
Vent-cover screws.....	.32	Obturator springs.....	1.95

In ordering spare parts always give the name of the maker, model, and number of gun for which parts are required.

SIGHTS FOR 3.2-INCH B. L. RIFLE.

[See "Handbook of Sights for Cannon, 1899."]

The front sight is fastened to rimbases of the gun by four screws. It is composed of the following principal parts:

No.	Official name of part.	Material.	Price each.
1	Body.....	Bronze.....	
1	Cross carrier.....	Brass.....	
1	Cross.....	Steel ribbon.....	
1	Direction sight.....	Steel.....	
1	Clamping screw.....	do.....	
4	Screws for securing base.....	Brass.....	
	Total.....		\$6.00

REAR SIGHT.

The rear sight fits into a socket at the rear of the gun, being provided with a seating pin to insure correct seating of sight, and is composed of the following principal parts, to wit:

No.	Official name of part.	Material.	Price each.
1	Graduated vertical limb .....	.....	.....
1	Base .....	.....	.....
1	Trunnion .....	.....	.....
1	Deflection scale .....	.....	.....
1	Level .....	.....	.....
1	Deflection screw .....	.....	.....
1	Elevating screw .....	.....	.....
1	Sighting leaf .....	.....	.....
1	Vernier .....	.....	.....
1	Adjusting screw of spirit level .....	.....	.....
1	Trunnion clamping screw .....	.....	.....
1	Seating pin .....	.....	.....
	Total .....	.....	\$20.00

TELESCOPIC SIGHTS.

Telescopic sights are issued for 3.2-inch field guns, one for every two guns. For full description of and instructions for their use, see "Handbook of Telescopic Sights," issued by the Ordnance Department.

RANGE FINDERS.

There are issued to each battery three Weldon range finders, one for each platoon.

FUSES.

Fuses used for 3.2-inch projectiles are:

High resistance base fuse C for shell. For prices see page 345.

High resistance 15-second combination fuse for shrapnel. For prices see page 347.

PRIMERS.

The following primers are used with 3.2-inch B. L. rifle, to wit:

Friction primers, axial. For prices see page 352.

Friction primers, radial. For prices see page 352.

Axial or radial electric primers. For prices see page 352.

For full description of fuses, see pamphlet "Fuses for Field, Siege, and Seacoast Powder Charged Shell and Shrapnel," issued by Ordnance Department.

For allowance of material, supplies, etc., see page 509-572.

For list of spare parts issued with these guns, see page 463.

AMMUNITION.

For method of packing ammunition for these guns for shipment, see page 651.

For allowance of ammunition for target practice, saluting, etc., see G. O. 99, A. G. O., 1903.

SUBCALIBER TUBES AND FITTINGS FOR 3.2-INCH B. L. RIFLE.

There are issued to each battery of light artillery three subcaliber tubes (caliber .30 rifle) and complete set of fittings.

A set of subcaliber fittings is composed of the following:

	Price each.		Price each.
1 breech plate.....	\$17.92	1 recoil-arm bolt.....	
1 breech-plate sleeve.....	17.00	1 recoil-arm nut.....	
3 breech-plate screws.....		1 recoil stirrup.....	
3 breech-plate screw washers.....		1 recoil stirrup pin.....	
1 muzzle sleeve.....	5.82	1 recoil stirrup shoe.....	
1 muzzle rest.....		1 recoil stirrup shoe pin.....	
2 muzzle-rest screws.....		2 recoil stirrup screws.....	
2 muzzle-rest pins.....		1 yoke.....	
1 muzzle spring.....		1 yoke hinge.....	
1 muzzle-spring screw.....		1 yoke-hinge pin.....	
1 muzzle-spring pin.....		1 yoke plate.....	
2 connecting rods.....		4 yoke-plate screws.....	
2 connecting-rod screws, front.....		1 yoke-binding screw.....	
2 connecting-rod screws, rear.....		1 binder.....	
2 recoil arms.....	\$4.00	1 lock screw.....	
1 recoil-arm stand.....	1.50	1 butt-binding screw.....	
2 recoil-arm screws.....		1 butt-binding screw pin.....	

Price of subcaliber attachment complete, \$54.86.

The following spare parts for subcaliber tube attachments are issued to the service:

Spare parts for subcaliber tube (caliber .30 rifle) and attachments.

[One year's supply. All expendable.]

	Price each.		Price each.
1 bolt, model 1898.....	\$0.61	1 hinge bar, complete.....	\$0.11
1 carrier, model 1898.....	.82	2 magazine springs.....	.05
1 cut-off, model 1898, complete.....	.12	1 mainspring, model 1898.....	.02
1 ejector.....	.25	1 safety lock, complete.....	.11
1 ejector pin.....	.51	1 sear.....	.06
1 extractor, complete.....	.24	1 sear spring.....	.01
1 extractor pin.....	.01	1 side plate, model 1898.....	.34
1 extractor rivet.....	.01	1 side-plate screw.....	.01
1 extractor spring.....	.03	1 sleeve.....	.28
1 firing pin, assembled.....	.22	1 striker.....	.12
1 follower.....	.15	1 trigger.....	.07
1 follower pin.....	.01	1 trigger pin.....	.01
1 gate, model 1898.....	.67		

With the old pattern attachment (rifle with stock) there is also issued one recoil-arm screw, and with the later pattern attachment (rifle without stock) one extra thumbcrew (price each, 25 cents). There is also issued with each set of spare parts one wrench for each set of subcaliber fittings. (Price of wrench, each 75 cents.)

Cannon, U. S. Army—Weights, dimensions, and principal differences between models, field artillery.

[Projectiles (abbreviations): C. I., cast iron; shr., shrapped; C. S., common steel.]									
	3.2-inch B. L. rifle, model 1885.	3.2-inch B. L. rifle, model 1890.	3.2-inch B. L. rifle, model 1890 M.	3.2-inch B. L. rifle, model 1890 M.	3.2-inch B. L. rifle, model 1890 M.	3.2-inch B. L. rifle, model 1897.	3.2-inch B. L. rifle, model 1897.	3.6-inch B. L. rifle, model 1898.	5-inch B. L. howitzer, model 1898.
Number of guns (as existing Jan. 1, 1901),.....	1 to 5. Watertown Arsenal, and 6 at West Point. Foundry, 1-75 Watervliet Arsenal.	No. 49, W. A. All others converted to model 1897.	No. 68, W. A. All others converted to model 1897.	All converted to model 1897.	1-48, 50-62, 64-80, W. A., converted to model 1897.	1-48, 50-62, 64-80, W. A., converted to model 1897.	1-28, W. A.	1-75, W. A.	Type gun only.
Original models of 3.2-inch guns now model 1897.									
Principal parts of gun proper (steel forgings assembled with shrinkage).	Tube, jacket, trunnion hoop, sleeve, locking hoop, key ring, breech banding or base ring.	Tube, jacket. (Trunnions are part of jacket.)	Tube, jacket. (Trunnions are part of jacket.)	Tube, jacket, locking hoop. (Trunnions are part of jacket.)	Tube, jacket, locking hoop. (Trunnions are part of jacket.)	Tube, jacket, locking hoop. (Trunnions are part of jacket.)	Tube, jacket. (Trunnions are part of jacket.)	Gun body—single steel forging.	Tube, jacket, breech bush, locking recoil band. (No trunnions.)
Added in conversion to model 1897		Lining tube shrunk and secured by 3 spline screws, riveted.	Lining tube shrunk and secured by 3 spline screws, riveted.	Lining tube shrunk and secured by 3 spline screws, riveted.	Lining tube shrunk and secured by 3 spline screws, riveted.	Lining tube shrunk and secured by 3 spline screws, riveted.			
Breech closure.....	Interrupted screw.	Interrupted screw.	Interrupted screw.	Interrupted screw.	Interrupted screw.	Interrupted screw.	Interrupted screw.	Interrupted screw.	Interrupted screw.
Motions to open (or close) breech	3 a	3 a	3 a	3 a	3 a	3 a	3 a	3 a	1.
Primer inserted, when.....	Breech locked	Breech locked	Breech locked	Breech locked	Breech locked	Breech locked	Breech locked	Breech locked	Breech open.
Primer removed, how.....	Withdrawn by hand.	Withdrawn by hand.	Withdrawn by hand.	Withdrawn by hand.	Withdrawn by hand.	Withdrawn by hand.	Withdrawn by hand.	Uncrewed and withdrawn by hand.	Ejected by hand aide, 1 motion.
Vent	Radial.	Axial.	Axial.	Axial.	Axial.	Axial.	Axial.	Axial.	Axial.
Obturation.....	Plastic pad between steel cups. b	Plastic pad with copper washers on edge, steel cup, small split ring.	Plastic pad between rings (5).	Plastic pad between rings (5).	Plastic pad between rings (5).	Plastic pad between rings (5).	Plastic pad between rings (5).	Freight sheet (last steel plug.)	Plastic pad between split rings (3).

Total weight of gun.....	820 pounds.....	795 pounds.....	824 pounds.....	829 pounds.....	1,200 pounds.....	245 pounds.....	1,220 pounds <i>d</i>
Weight of breech mechanism.....	85 pounds.....	86 pounds.....	84 pounds.....	86 pounds.....	94 pounds.....	31.5 pounds.....	116 pounds.....
Shipping weight of gun.....	1,079 pounds.....	1,046 pounds.....	1,074 pounds.....	1,079 pounds.....	1,450 pounds.....	1,460 pounds.....	1,460 pounds <i>d</i>
Outside dimension of packing box:							
Length.....	98 inches.....	98 inches.....	98 inches.....	98 inches.....	98 inches.....	32 inches.....	1220 pounds <i>d</i>
Width.....	194 inches.....	194 inches.....	194 inches.....	194 inches.....	194 inches.....	17 inches.....	116 pounds.....
Depth.....	15 inches.....	15 inches.....	15 inches.....	15 inches.....	15 inches.....	12 inches.....	1,460 pounds <i>d</i>
Material.....	2-inch spruce.....	2-inch spruce.....	2-inch spruce.....	2-inch spruce.....	2-inch spruce.....	1-inch pine.....	
Total length of gun.....	7.66 feet.....	7.31 feet.....	7.31 feet.....	7.31 feet.....	7.31 feet.....	2.05 feet.....	5.66 feet.....
Length of bore.....	26 calibers.....	25.2 calibers.....	25.2 calibers.....	25.2 calibers.....	25.2 calibers.....	5.3 calibers.....	12 calibers.....
Maximum diameter, breech.....	9.56 inches.....	9 inches.....	9 inches.....	9 inches.....	9 inches.....	6.4 inches.....	11.8 inches.....
Diameter of muzzle.....	8.1 inches.....	5 inches.....	5 inches.....	5 inches.....	5 inches.....	7 inches.....	7 inches.....
Diameter of trunnions.....	3.8 inches.....	3.8 inches.....	3.8 inches.....	3.8 inches.....	3.8 inches.....	3.8 inches.....	No trunnions
Length of trunnions.....	2.25 inches.....	2.7 inches.....	2.7 inches.....	2.7 inches.....	2.7 inches.....	3 inches.....	
Distance between rim bases.....	9.5 inches.....	9.5 inches.....	9.5 inches.....	9.5 inches.....	9.5 inches.....	9.5 inches.....	
Distance of axis of trunnions from muzzle.....	57.719 inches.....	57.719 inches.....	57.719 inches.....	57.719 inches.....	57.719 inches.....	14.6 inches.....	
Rifling:							
Number of grooves.....	24.....	24.....	24.....	24.....	24.....	20.....	30.....
Width of grooves.....	0.3 inch.....	0.3 inch.....	0.3 inch.....	0.3 inch.....	0.3 inch.....	0.4464 inch.....	0.3796 inch.....
Depth of grooves.....	0.06 inch.....	0.04 inch.....	0.04 inch.....	0.04 inch.....	0.04 inch.....	0.046 inch.....	0.03 inch.....
Width of bands.....	0.1188 inch.....	0.1188 inch.....	0.1188 inch.....	0.1188 inch.....	0.1188 inch.....	0.12 inch.....	0.15 inch.....
Twist.....	1 in 60 to 1 in 25 calibers.....	1 in 60 to 1 in 25 calibers.....	1 in 60 to 1 in 25 calibers.....	1 in 60 to 1 in 25 calibers.....	1 in 60 to 1 in 25 calibers.....	1 in 40 to 1 in 25 calibers.....	1 in 60 to 1 in 25 calibers.....
Powder chamber:							
Form.....	Elliptical.....	Cylindrical.....	Cylindrical.....	Cylindrical.....	Cylindrical.....	Cylindrical.....	Cylindrical.....
Length <i>f</i>	11.58 inches.....	10.7 inches.....	10.7 inches.....	10.7 inches.....	12.775 inches.....	2.88 inches.....	4.12 inches.....
Diameter.....	Varies.....	3.6 inches.....	3.82 inches.....	3.82 inches.....	3.9 inches.....	3.8 inches.....	5.02 inches.....
Capacity.....	109.7 cubic inches.....	110.3 cubic inches.....	110.3 cubic inches.....	60 cubic inches.....	148.5 cubic inches.....	83.2 cubic inches.....	9.6 cubic inches.....
Total capacity of bore.....	714.7 cubic inches.....	690.5 cubic inches.....	690.5 cubic inches.....	648.3 cubic inches.....	906.5 cubic inches.....	200 cubic inches.....	
Travel of shot.....	71.991 inches.....	69.8 inches.....	69.8 inches.....	76.175 inches.....	72.275 inches.....	16.065 inches.....	56.15 inches.....
Ammunition.....	Projectile, charge, and primer separate. Some cartridges in tin packing case, which is removed before loading into gun.	Projectile, charge, and primer separate. Some cartridges in tin packing case, which is removed before loading into gun.	Projectile, charge, and primer separate. Some cartridges in tin packing case, which is removed before loading into gun.	Projectile, charge, and primer separate. Some cartridges in tin packing case, which is removed before loading into gun.	Projectile, charge, and primer separate. Some cartridges in tin packing case, which is removed before loading into gun.	Projectile, charge, and primer separate. Some cartridges in tin packing case, which is removed before loading into gun.	Projectile, charge, and primer separate. Some cartridges in tin packing case, which is removed before loading into gun.

d Translating block and rotating about hinge are counted as one motion.

e Nos. 1-25, Watertown and West Point Foundry series, had originally Freyre issue.) gas checks. Were later altered as above.

f Conversions from model 1890 weigh 296 pounds. Conversions from model 1890 M1 weigh 829 pounds.

g Including recoil band.

h Inside dimensions of recoil band shrunk on gun are: Vertical, 13 inches; horizontal, 19 inches.

i From front face of obturator spindle to base of projectile.

Cannon, U. S. Army—Weights, dimensions, and principal differences between models, field artillery—Continued.

Projectile: Kind.....	3.2-inch B. L. rifle, model 1898.	3.2-inch B. L. rifle, model 1890.	3.2-inch B. L. rifle, model 1890 M.	3.2-inch B. L. rifle, model 1890 M.	3.2-inch B. L. rifle, model 1890 M.	3.2-inch B. L. rifle, model 1897.	3.6-inch B. L. rifle, model 1891.	3.6-inch B. L. mortar.	5-inch B. L. howitzer, model 1890.
Length.....	C. I. shell. 8 12.5	shr. a 2.4 13.5	C. I. shell. 8 12.5	shr. a 2.4 13.5	C. I. shell. 8 12.5	shr. a 2.4 13.5	C. I. shell. 8 12.5	shr. a 2.5 20	C. I. | C. G. | shr. shell | shell | shell 8 | 8 | 8 12.5 | 12.5 | 12.5
Weight, filled and fused.....	12.5	13.5	12.5	13.5	12.5	13.5	12.5	20	45
Ratio, weight to weight of piece.....	7	7	7	7	7	7	7	4	45
Weight of bursting charge, rifle powder, ounces.....	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	45
Band to base.....	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35
Sectional density.....	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
Primer.....	Field gun, friction, ax- ial vent.	Field gun, friction, ax- ial vent.	Field gun, friction, ax- ial vent.	Field gun, friction, ax- ial vent.	Field gun, friction, ax- ial vent.	Field gun, friction, ax- ial vent.	Field gun, friction, ax- ial vent.	Obturator (screwed) friction pri- mer.	New friction primer.
Powder: Kind.....	8. H. field cannon.	8. H. field cannon.	8. H. field cannon.	8. H. field cannon.	8. H. field cannon.	8. H. field cannon.	8. H. field cannon.	8. H. field cannon.	8. H. field cannon.
Black.....	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.
Smokeless.....	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.	3.2-inch field gun, models 1886 and 1890.
Weight— Black.....	3.5 pounds.....	3.5 pounds.....	3.5 pounds.....	3.5 pounds.....	3.5 pounds.....	3.5 pounds.....	3.5 pounds.....	3.5 pounds.....	3.5 pounds.....
Smokeless.....	18.75 ounces.....	18.75 ounces.....	18.75 ounces.....	18.75 ounces.....	18.75 ounces.....	18.75 ounces.....	18.75 ounces.....	18.75 ounces.....	18.75 ounces.....
Density of loading— Black.....	3882 pounds.....	3882 pounds.....	3882 pounds.....	3882 pounds.....	3882 pounds.....	3882 pounds.....	3882 pounds.....	3882 pounds.....	3882 pounds.....
Smokeless.....	2962 ounces.....	2962 ounces.....	2962 ounces.....	2962 ounces.....	2962 ounces.....	2962 ounces.....	2962 ounces.....	2962 ounces.....	2962 ounces.....
Muzzle velocity: Black.....	1,465 feet per second.....	1,465 feet per second.....	1,465 feet per second.....	1,465 feet per second.....	1,465 feet per second.....	1,465 feet per second.....	1,465 feet per second.....	1,465 feet per second.....	1,465 feet per second.....
Smokeless.....	do.....	do.....	do.....	do.....	do.....	do.....	do.....	do.....	do.....
Maximum pressure per square inch: Black.....	26,000 pounds.....	26,000 pounds.....	26,000 pounds.....	26,000 pounds.....	26,000 pounds.....	26,000 pounds.....	26,000 pounds.....	26,000 pounds.....	26,000 pounds.....
Smokeless.....	do.....	do.....	do.....	do.....	do.....	do.....	do.....	do.....	do.....
Muzzle energy: Black.....	312 foot-tons.....	312 foot-tons.....	312 foot-tons.....	312 foot-tons.....	312 foot-tons.....	312 foot-tons.....	312 foot-tons.....	312 foot-tons.....	312 foot-tons.....
Smokeless.....	do.....	do.....	do.....	do.....	do.....	do.....	do.....	do.....	do.....

Weights of 3.2-inch gun, model 1885, carriage, limber, caisson, and equipment.

GUN, CARRIAGE, AND LIMBER.

No.	Article.	Weight.	Total.
		Lbs. Oza.	Lbs. Oza.
1	3.2-inch B. L. rifle.....		822 0
1	Carriage, with brakes (heavy.....)		1,200 0
	(light.....)		(1,166) 0
1	Jointed sponge and rammer, with sponge cover.....	7 0	
2	Short rammer and sponges combined, and covers.....	7 14	
1	Prolonge (section picket rope).....	15 8	
2	Primer pouches.....	1 0	
2	Lanyards.....	0 8	
			31 14
1	Limber, complete with neck yoke.....		967 4
1	Wheel-grease can and spatula.....	5 8	
1	Breech sight.....	2 2	
1	Breech-sight pouch.....	0 9	
1	Sperm oiler.....	0 7	
1	Tool box, with tools.....	9 2	
1	Pole prop.....	2 8	
2	Paulins.....	46 0	
1	Knapack boot.....	3 8	
2	Haversacks.....	4 6	
			74 2
42	Projectiles—shell and shrapnel, 13.5 pounds each.....	567 0	
44	Cartridges, 3½ pounds.....	186 0	
44	Cartridge bags.....	2 12	
			734 12
	Total (for heavy carriage.....)		3,927 0
	(for light carriage.....)		3,798 0

Weight per horse with heavy carriage, 654.5 pounds.

Weight per horse with light carriage, 632 pounds.

Price of carriage, \$830.

Price of limber, \$300.

CAISSON.

1	Caisson, complete, with brakes and neck yoke.....		2,216 8
2	Axes, handled.....	10 0	
2	Pickaxes, handled.....	15 0	
2	Shovels, long-handled.....	8 0	
2	Spades, short-handled.....	10 0	
2	Paulins.....	46 0	
4	Water buckets (2 nests).....	16 0	
1	Lantern.....	1 8	
1	Prolonge (picket-rope section).....	15 8	
1	Pole prop.....	2 8	
1	Grease can and spatula.....	5 8	
1	Knapack boot.....	3 8	
			132 8
126	Projectiles, shell and shrapnel, 13.5 pounds each.....	1,701 0	
132	Cartridges, 3½ pounds each.....	496 0	
132	Cartridge bags.....	8 4	
			2,204 4
	Total weight.....		4,553 4

Weight per horse:

	Pounds.
With above equipment.....	759
With above equipment and spare wheel.....	792
With above equipment and spare pole.....	763+
With above equipment and spare handspike.....	768+

Weight of caisson:

With spare wheel.....	4,753
With spare pole.....	4,581
With spare handspike.....	4,566.75

Price of caisson, \$425.

Price of limber, \$300.

Weights of forge and battery wagon and equipment.

No.	Article.	Weight.	Total.
1	Forge and battery wagon, complete, with brakes and neck yoke, but without stores.....	<i>Lbs. Ozs.</i>	<i>Lbs. Ozs.</i>
1	Set blacksmith's and farrier's tools, complete.....	39 8	2,081 0
1	Coal bag.....	4 8	
1	Forge, complete.....	81 8	
1	Tool chest, wheelwright's, complete.....	55 0	
1	Set tools, wheelwright's, complete.....	47 8	
1	Tool chest, saddler's, complete.....	50 0	
1	Set tools, saddler's, complete.....	28 8	
1	Pole prop.....	2 8	
1	Vise.....	23 0	
1	Hammer, sledge.....	10 8	
1	Anvil.....	100 0	
1	Battery-wagon lunette prop.....	5 0	
1	Grindstone, flanges, shaft, and crank, complete.....	50 8	
1	Grindstone frame, complete.....	18 0	
1	Can for coal oil.....	7 8	
1	Can for sperm oil.....	1 0	
1	Can, grease and spatula.....	5 8	
1	Lantern.....	1 8	
2	Water buckets.....	7 8	
2	Paulins.....	46 0	
1	Prolonge (picket-rope section).....	15 8	
	Total weight.....		590 8
			2,671 8

Weight per horse, without stores, 445 pounds.

Price of forge and battery wagon, \$761.45.

Weights of principal parts of artillery store wagon.

No.	Parts.	Weight, each.	Total weight.	Remarks.	Draw- ing.
		<i>Pounds.</i>	<i>Pounds.</i>		
1	Lower front running gear assembled, without wheels.....		246		2
1	Top front running gear assembled, complete.....		83		2
1	Rear axle.....		120 1/2	National tubular axle..	2, 3
2	Rear axle end bolster clips, yokes, and nuts.....	3 1/2	6 1/2	Steel No. 1.....	2, 3
1	Rear bolster.....		22 1/2	Oak.....	2
2	Rear axle braces.....	9	18	Steel No. 1.....	3
2	Rear axle clips and nuts.....	1 1/2	3 1/2	do.....	3
10	Rear axle brace bolts.....	2	20	do.....	3
1	Rear axle center brace.....		5 1/2	Steel No. 1.....	3
1	Rear axle center brace, clip and nut.....		2	do.....	3
1	Rear axle center brace, bolt and nut.....		1	do.....	3
1	Doubletree bolt and brace.....		3	Steel No. 1.....	4
2	Doubletree brace bolts and nuts.....	1	2		
1	Brake shaft.....		47 1/2	Steel No. 3.....	7
2	Brake shoes.....	2 1/2	5	Oak.....	7
1	Brake stake.....		8	Hickory.....	7
2	Brake shoe holders.....	1 1/2	3	0.25 by 2 inch angle.....	7
2	Brake shoe holder bolts and nuts.....	1	2		
1	Brake spring with eyebolt.....		1	Steel No. 1.....	7
2	Brake beam hangers.....	2 1/2	5 1/2	do.....	7
2	Brake beam hanger bolts.....	1	2	Steel, No. 1.....	7
2	Brake beam hanger bearings.....	1	2	Tool steel and cast iron.....	7
1	Brake latch.....		1	Steel, No. 1.....	7
1	Brake latch pin.....		3 1/2	Teeth tool steel, tempered.....	7
1	Quadrant.....		4 1/2	Bracket, bronze, No. 1..	7
2	Brake quadrant brackets, with 4 bolts and nuts.....	2 1/2	5	Steel, No. 1.....	7
1	Brake connecting rod.....		1	do.....	7
1	Brake connecting-rod pin.....		1	Bronze, No. 1.....	7
3	Brake shaft bearings.....	1 1/2	4 1/2	Steel, No. 1.....	7
3	U-bolts for brake shaft bearings, with 4 nuts.....	1	3		
1	Brake beam.....		17	Oak.....	7
4	Bolts, with nuts, to fasten rear gear to box.....	1 1/2	6	Bronze, No. 1.....	3
9	Bevel washers, rear bolster.....	1	9		
14	Bolts to fasten front upper gear.....		3		
2	Rear wheels.....	164	328	Archibald pattern.....	8
2	Front wheels.....	124	248	do.....	8

Weights of principal parts of artillery store wagon—Continued.

No.	Parts.	Weight, each.	Total weight.	Remarks.	Draw- ing.
		<i>Pounds.</i>	<i>Pounds.</i>		
4	Linchpins	1	4	Tempered spring steel..	8
4	Linch washers	$\frac{1}{2}$	3	Steel, No. 1	8
1	Wagon body, assembled		378		9
6	Bows	$\frac{1}{2}$	27	Hickory	9
1	Canvas cover		27		
1	Tool box		42		10
1	Pole without pole prop.		47 $\frac{1}{2}$		11
1	Pole prop.		11		11
2	Singletrees	$\frac{7}{8}$	15		11
1	Doubletrees		17 $\frac{1}{2}$		11
1	Neck yoke		11 $\frac{1}{2}$		11
	Weight of wagon without equipment		1,791 $\frac{1}{2}$		

Weight of equipments for tool box, artillery store wagon.

No.	Parts.	Weight, each.	Total weight.	Remarks.	Draw- ing.
		<i>Pounds.</i>	<i>Pounds.</i>		
1	Wheel grease can and knife	6		Special	10
1	Lantern, railroad	2		Commercial	10
1	Coal oil can	4		Special	10
1	Hammer, hand, 12.25 ounce, handled	1 $\frac{1}{2}$		Commercial	10
1	Screw wrench, 12-inch	2		Commercial, Coe's	10
1	Engineer's wrench, double head	1		Special	10
1	Brake rope	$\frac{1}{2}$			
1	Brake releasing rope	$\frac{1}{2}$			
	Weight of equipment	18 $\frac{1}{2}$			

Weight of wagon and equipment 1,810 pounds.
Price of artillery store wagon, \$694.

Correct nomenclature for and list of parts of 3.2-inch field gun carriage.

Parts of carriage.	Bill of material.				Material.
	W.	T.	D.	L.	
	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
One body.....					
Two wheels.....					
<i>Parts of one wheel.</i>					
1 nave box, with inside flange.....					Archibald patent wheel, malleable-iron nave boxes, 7 & standard pattern for 3.2-inch field gun carriages; tires, rounded edges, 2½ by ½ inch, to overlap ½ inch.
1 nave box, outside flange.....					
8 nave-box flange bolts and nuts.....					
1 nave-box assembling nut.....					
1 nave-box assembling-nut lock screw.....					
16 spokes.....					
1 felly (8 sections).....					
1 set (8) of dowels.....					
1 set (16) of dowel bolts.....					
1 tire (rounded edges).....					
8 tire bolts and nuts.....					
<i>Metal parts of body.</i>					
1 axle.....			8	76½	Steel, No. 3.
2 brake eye straps.....	8	2		9	Steel, No. 1.
2 brake eye-strap keys.....	½	½		31	Steel, No. 3.
2 lynch washers.....	4½	½		9	Steel, No. 1.
2 lynch-washer stop pins.....			½	2	Do.
2 lynchpins.....	1½	1½		9	Steel, No. 2.
2 lynchpin clamps (for the Beyer lynchpin clamp, ½ by ½ by 12 inches long).....	1	½		12	Spring steel.
2 lynchpin clamp rivets.....			½	2½	Norway iron.
2 axle plates..... each..	21½	½		45½	Steel, No. 1.
2 flank plates (outside)..... each..	22	½		101	Special steel plate.

Correct nomenclature for and list of parts of 3.3-inch field gun carriage—Continued.

Parts of carriage.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Metal parts of body—Continued.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
2 flank plates (inside) each..	17½	½	.....	89	Special steel plate.
1 front transom	13	½	.....	16	Steel, No. 1.
1 middle transom	10	½	.....	16	Do.
1 trail-box upper transom	11	½	.....	18½	Do.
1 trail-box lower transom	10	½	.....	12½	Do.
1 rear transom	7½	½	.....	12	Do.
2 axle seats	19½	½	.....	27½	Do.
2 axle-seat stiffening plates (out- side), each.	9	½	.....	17	Do.
2 axle-seat stiffening plates (in- side), each.	6	½	.....	17	Do.
36 axle-seat stiffening-plate rivets.	.....	.....	.....	.....	Half-round heads.
4 axle-seat standards (2 right, 2 left).	1½	1½	.....	30	Steel, No. 1.
4 axle-seat reinforce pieces (2 right, 2 left).	1½	.....	.....	12½	Do.
8 axle-seat rivets .....	.....	.....	.....	1	Half-round heads.
8 axle-seat rivets .....	.....	.....	.....	1	Do.
8 axle-seat rivets .....	.....	.....	.....	1½	Do.
4 axle-seat rivets .....	.....	.....	.....	1½	Do.
8 axle-seat rivets .....	.....	.....	.....	1½	Do.
2 axle-seat guard rails	1½	.....	.....	40	Steel, No. 2.
2 axle-seat guard-rail hinge pins.	.....	.....	.....	1	Norway iron.
2 axle-seat guard-rail hinge-pin nuts.	.....	.....	.....	1	Steel, No. 1.
2 axle-seat guard-latch shafts .....	.....	.....	.....	1	Do.
2 axle-seat guard-latch-shaft thumb pieces.	.....	.....	.....	4½	Do.
2 axle-seat guard-latch-shaft thumb-piece stop pins.	.....	.....	.....	1	Do.
1 trail-box bottom	9	½	.....	17	Do.
1 sponge bucket compartment bot- tom.	8½	½	.....	13	Do.
1 compartment bottom	6½	.....	.....	18½	Do.
1 trail-box lid	10	.....	.....	15½	Do.
1 trail-box hinge plate	4½	.....	.....	10½	Do.
2 trail-box hinge pieces	3	.....	.....	20	Do.
1 trail-box hinge pin .....	.....	.....	.....	10	Do.
1 trail-box hasp	1½	.....	.....	2½	Do.
1 trail-box hasp strap	1½	.....	.....	2	Do.
1 trail-box turn-buckle .....	.....	.....	.....	.....	Bronze casting.
1 trail-box turn-buckle stud .....	.....	.....	.....	1½	Steel, No. 1.
12 trunnion-bed pieces	4½	2½	.....	30	Do.
2 cap squares .....	.....	.....	.....	20	Sunk heads.
4 cap-square eyebolts	8	2	.....	20	Steel, No. 1.
4 cap-square eyebolt keys	1	1½	.....	14	Do.
4 cap-square eyebolt key chains .....	.....	.....	.....	16½	Do.
2 cap-square eyebolt eye studs .....	.....	.....	.....	1½	Norway iron.
6 cap-square eyebolt rings .....	.....	.....	.....	40	Steel, No. 1.
1 lunette	5½	2	.....	14½	Norway iron.
2 trail handles	1½	.....	.....	5½	Steel, No. 1.
2 wheel guards	1½	1½	.....	14	Common tool steel.
4 wheel-guard bolts .....	.....	.....	.....	12	Steel, No. 1.
4 wheel-guard bolt nuts .....	.....	.....	.....	1½	Common tool steel.
1 handspike attachment, front	2½	2	.....	4	Norway iron.
1 handspike attachment, rear	2½	2	.....	4	Hexagonal, U. S. standard.
4 handspike attachment bolts .....	.....	.....	.....	1½	Steel, No. 2.
2 handspike attachment pins (1 front, 1 rear).	.....	.....	.....	6	Do.
1 key split for pin .....	.....	.....	.....	1	Machine bolts, hexagonal heads.
1 trail handspike:	.....	.....	.....	.....	Steel, No. 3.
<i>Metal parts—</i>	.....	.....	.....	.....	Cotter pin.
1 socket	4½	3	.....	9	Steel No. 1.
1 trail-handspike spline	2½	.....	.....	50	Do.
1 lower band	1½	.....	.....	7	Do.
1 middle band	1½	.....	.....	7	Do.
1 upper band .....	.....	.....	.....	7	Do.
7 rivets .....	.....	.....	.....	18	Best quality wrought-iron pipe.
6 washers .....	.....	.....	.....	8	Best rivet iron.
1 handspike clasp (2 pieces).	.....	.....	.....	.....	Steel, No. 1.
1 handspike-clasp plate .....	.....	.....	.....	2½	Do.
1 handspike-clasp rivet .....	.....	.....	.....	.....	Do.
1 handspike-clasp washer .....	.....	.....	.....	.....	Rivet iron.
1 handspike-clasp plate rivet.	.....	.....	.....	.....	Steel, No. 1.
1 handspike-clasp plate rivet.	.....	.....	.....	.....	Oval head.
1 handspike-clasp plate rivet.	.....	.....	.....	.....	Rivet iron.

Correct nomenclature for and list of parts of 3.2-inch field gun carriage—Continued.

Parts of carriage.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Metal parts of body—Continued.</i>					
Long rammer attachment:					
<i>Metal parts—</i>					
1 long-rammer-attachment clasp.	<i>Inches.</i> 1½	<i>Inches.</i> ½	<i>Inches.</i>	<i>Inches.</i> 6	Steel, No. 1.
1 long-rammer-attachment hinge pin.	.....	.....	.....	1½	Do.
1 long-rammer-attachment strap.	1½	½	.....	8	Do.
1 long-rammer-attachment turn-buckle.	.....	.....	.....	1	Do.
1 long-rammer-attachment turn-buckle stud.	.....	.....	.....	2	Do.
1 long-rammer-attachment turn-buckle stop pin.	.....	.....	.....	½	Do.
1 long-rammer-attachment sponge-head support.	3½	½	.....	7½	Do.
2 long-rammer-attachment rammer heads (1 front, 1 rear).	.....	.....	.....	.....	Bronze castings.
2 long-rammer-attachment rivets.	.....	.....	.....	½	Oval heads.
2 long-rammer-attachment rivets.	.....	.....	.....	½	Do.
4 long-rammer-attachment rivets.	.....	.....	.....	1½	Do.
Short (combined) rammer and sponge attachment:					
<i>Metal parts—</i>					
1 short-rammer and sponge-attachment plate.	7	.165	.....	11	No. 8 steel, No. 1.
2 short-rammer and sponge-attachment clasps.	.....	.....	.....	7½	Spring steel.
2 short-rammer and sponge-attachment hinge pins.	.....	.....	.....	1½	Steel, No. 1.
2 short-rammer and sponge-attachment clasp latch shafts.	.....	.....	.....	3	Do.
4 short-rammer and sponge-attachment clasp thumb pieces.	.....	.....	.....	6	Do.
1 elevating device:					
<i>Metal parts—</i>					
1 fork body.....	.....	.....	{ Outside 1.31, in- side 0.55 }	18½	Double extra strong ½-inch lap-welded steel tubing.
1 fork front-hinge piece....	3	1½	.....	11	Steel, No. 1.
1 fork rear-hinge piece....	1½	1½	.....	7	Do.
1 fork front-pivot transom-bolt.	.....	.....	.....	15½	Norway iron.
1 fork front-pivot transom-bolt lock nut.	{	.....	.....	.....	Hexagonal, U. S. standard.
1 fork front-pivot transom-bolt separator.	{	.....	.....	9½	Hot-pressed.
2 fork front-hinge-piece journal thimbles.	.....	.....	.....	2½	Extra strong ½-inch lap-welded steel tubing.
1 fork rear-pivot bolt.....	.....	.....	.....	6½	Do.
1 fork rear-pivot bolt nut.	.....	.....	.....	.....	Soft decarbonized steel.
2 breech-strap eye washers.	3	½	.....	6	Hexagonal, U. S. standard.
1 inner elevating screw....	.....	.....	2½	8½	Steel, No. 1.
1 outer elevating screw....	.....	.....	2½	10½	Steel, No. 3.
1 horizontal gear.....	.....	.....	.....	.....	Do.
2 horizontal-gear semicircular keys.	5½	½	.....	5½	Bronze casting.
6 horizontal-gear semicircular key screws.	.....	.....	.....	7	Steel, No. 1.
1 horizontal-gear feather key.	.....	.....	.....	1	Do.
1 horizontal-gear feather-key screw.	.....	.....	.....	.....	Steel, No. 3.
1 crosshead.....	.....	.....	.....	.....	Bronze casting.
1 crosshead bearing (right).	.....	.....	.....	.....	Do.
1 crosshead split bearing (left).	.....	.....	.....	.....	Do.
1 crosshead-bearing split journal box.	.....	.....	.....	.....	Do.
9 crosshead-bearing bolts..	.....	.....	.....	33	Steel, No. 1.
9 crosshead-bearing nuts..	.....	.....	.....	.....	Hexagonal, U. S. standard.
1 vertical gear.....	.....	.....	.....	.....	Bronze casting.

Correct nomenclature for and list of parts of 3.9-inch field gun carriage—Continued.

Parts of carriage.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Metal parts of body—Continued.</i>					
1 elevator device—Continued.					
Metal parts—Continued.	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
1 crank spindle.....	2½	1½		3	Steel, No. 1.
1 crank.....	1½	1½		6	Do.
1 crank handle.....					Bronze casting.
1 crank-handle pin.....				7	Steel, No. 1.
1 crank key.....				1½	Soft decarbonized steel.
1 guard plate.....	9½	½		16½	Steel, No. 1.
2 guard-plate bolts, front.....				7	Hexagonal, U. S. standard.
2 guard-plate bolt nuts.....					
2 guard-plate bolts, rear.....				8	
2 guard-plate bolt nuts.....					
40 various other bolts for carriage.....					
40 lock nuts for same.....					
2 bow-spring brakes:					
Metal parts for both—					
2 clevises.....	2½	1½		16	Steel, No. 2.
2 clevis bolts.....			1½	7	Best-quality Paragon lathe tool steel.
2 clevis-bolt nuts.....	1½	½		2	Steel, No. 1.
2 attachment sockets.....	3½	2½		8	Steel, No. 3.
2 locking levers.....	2	½		19	Spring steel.
2 locking-lever seat-rail studs.....	1½	½		10	Do.
2 locking-lever bolts.....	1½	1		3½	Steel, No. 1.
2 locking-lever bolt nuts.....	1½	½		2½	Best-quality Paragon lathe tool steel.
4 bow springs.....	2	1½		23	Steel, No. 1.
8 bow-spring bolts.....				24	Hobson's choice steel.
8 bow-spring bolt nuts.....	1½	½		12	Do.
2 brake shoes.....	2½	2½		17	Steel, No. 1.
1 jointed sponge and rammer:					
Metal parts—					
1 joint-hinge piece.....	1½	½		3½	Steel, No. 1.
2 joint ferrules.....				7	Soft decarbonized steel.
4 joint-ferrule pins.....				7	
1 joint sleeve.....				7½	Bronze casting.
1 joint-sleeve stop.....					Do.
2 staff safes.....				4	Do.
2 staff-safe pins.....			.165		Braze wire.
2 rammer-head bands.....	1	½		18	Sheet copper, hard.
10 copper tacks.....				½	6-ounce copper tacks.
2 combined short sponges and rammers:					
Metal parts for both—					
2 fixed hooks.....					Bronze castings.
4 fixed-hook rivets.....			.165	8	Braze wire.
2 movable hooks.....					Bronze castings.
2 movable-hook springs.....			.07196		Spring-steel wire.
2 movable-hook nuts.....					Bronze castings.
2 socket ferrules.....					Do.
4 socket-ferrule rivets.....			.165	8	Braze wire.
2 grooved-ferrule attachments.....					Bronze castings.
2 grooved-ferrule-attachment rivets.....			.165	4	Braze wire.
2 rammer heads.....					Bronze castings.
2 wood screws for fastening rammer heads.....				1½	Iron, No. 12.
<i>Wooden parts of carriage.</i>					
1 trail box, bottom.....	10	½		17	Whitewood.
<i>Wood and other parts of implements.</i>					
1 handspike.....	3	3		48	Hickory (halved on each side of spine).
1 jointed sponge and rammer staff.....	2	2		96	Ash.
1 jointed sponge and rammer head.....	4	4		8	Oak.
1 jointed sponge and rammer sponge head.....	3	3		10	Whitewood.
1 jointed sponge and rammer sponge.....	8½			9½	Carpet.
1 sponge cover, bore.....	11½			17½	Duck, No. 9, drab.
2 short sponge and rammer staves.....	2½	2½		64	Ash.
2 short sponge and rammer sponge heads.....	8	8		18	Whitewood.
2 short sponge and rammer sponges.....	8½			20	Carpet.
2 sponge covers, chamber.....	13½			26	Duck, No. 9, drab.
1 breech strap.....	2			96	Harness leather, black.
2 leather washers.....	4½	½		9	Rawhide or leather.

The parts for 3.2-inch field carriage of the earlier model are practically the same except the elevating device, which is of the lazy tong pattern, and parts of which are as follows:

Parts of elevating device (lazy tong).

Parts of carriage.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Elevating device:</i>					
<i>Metal parts—</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
2 side levers	2½	1½	.....	30	Low steel, No. 1.
2 side-lever eyebolts	2	1½	.....	6	Do.
2 side-lever eyebolt nuts, hexagonal.	.....	.....	.....	.....	U. S. standard, hot pressed.
1 side-lever journal rod .....	.....	.....	1½	8	Low steel, No. 1.
4 short arms .....	.....	.....	.....	16	Do.
4 levers	1½	.....	.....	52	Hobson's choice steel.
4 long arms .....	.....	.....	.....	24	Low steel, No. 1.
2 lower journal rod .....	.....	.....	1½	64	Low steel, No. 1.
1 assembling bolt, long .....	.....	.....	1½	64	Low steel, No. 1.
2 assembling bolts, short .....	.....	.....	1½	9	Do.
1 central journal bolt .....	.....	.....	1½	64	Low steel, No. 1.
1 upper assembling bolt .....	.....	.....	1½	4	Low steel, No. 1.
2 breech-strap eye washers	8	.....	.....	6	Do.
10 assembling-bolt washers	1½	.....	.....	18	Do.
12 assembling-bolt nuts, hexagonal.	.....	.....	.....	.....	U. S. standard, hot pressed.
1 crosshead elevating nut .....	.....	.....	.....	.....	Aluminum bronze casting weight, 3 lbs.
2 crosshead elevating-nut slides.	1½	1	.....	84	Steel, No. 2.
1 elevating screw .....	.....	.....	1½	124	Hobson's choice steel.
1 elevating-screw washer	1½	.....	.....	18	Low steel, No. 1.
1 elevating-screw nut .....	.....	.....	1½	1	Do.
1 elevating-screw nut pin .....	.....	.....	.....	1½	Do.
2 lower journal brackets .....	.....	.....	.....	.....	Bronze casting; weight, 14 lbs.
2 lower journal caps .....	.....	.....	.....	.....	Bronze casting; weight, 2 lbs.
4 lower journal-cap screws .....	.....	.....	1	8	Low steel, No. 1.
8 assembling bolts (lower journal box to flange) .....	.....	.....	.....	32	Burden's best rivet iron.
12 assembling-bolt nuts	1	.....	.....	17½	Low steel, No. 1.
1 lower bracket	1½	1	.....	7	Do.
2 lower-bracket-screw bolts .....	.....	.....	.....	64	Burden's best rivet iron.
1 upper bracket	8	.....	.....	11	Low steel, No. 1.
2 upper-bracket bolts .....	.....	.....	.....	7	Burden's best rivet iron.
2 upper-bracket bolt nuts .....	.....	.....	.....	.....	Hexagonal, U. S. standard, hot pressed.
1 transom bolt .....	.....	.....	1	7	Low steel, No. 1.
2 transom-bolt nuts .....	.....	.....	.....	.....	Hexagonal, U. S. standard, hot pressed.
1 washer plate	2½	.....	.....	3	Low steel, No. 1.
4 washer-plate rivets .....	.....	.....	.....	3	Burden's best rivet iron.
1 crank handle .....	.....	.....	.....	.....	Bronze casting; weight, 2 lbs.
1 crank-handle pin .....	.....	.....	.....	1½	Low steel, No. 1.

Correct nomenclature for and list of parts of 3.2-inch field-gun limber.

Parts of limber.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
One limber body	
Two wheels	
<i>Parts of one wheel.</i>					
1 nave box with inside flange	Archibald patent wheel, malleable-iron nave boxes, U. S. standard pattern for 3.2-inch field limber, caisson, and battery wagon and forge; tires 2½ by 1 inch, rounded edges, overlapping ½ inch.
1 nave box with outside flange	
8 flange bolts and nuts	
1 nave-box assembling nut	
1 nave-box assembling-nut lock screw	
16 spokes	
1 felly (2 sections)	
2 felly-joint splices	
4 felly-joint splice bolts and nuts	
2 felly-joint splice rivets	
1 tire	
6 tire bolts and nuts	

Correct nomenclature for and list of parts of 3.2-inch field-gun limber—Continued.

Parts of limber.	Bill of material.				Material.
	W.	T.	D.	L.	
Metal parts of limber body.					
1 axle, tubular	Inches. 1	Inches. 3	Inches. 754		Wrought steel.
2 linch washers					Same as for 3.2-inch carriage.
2 linch-washer stop pins					Do.
2 linchpins					Do.
2 clasps					Do.
2 clasp rivets					Do.
2 side rails, each	2 1/2 by 2 1/2			45 1/2	Steel square root angle.
2 side-rail axle blockings	2 1/2			18	Wrought iron.
2 side-rail understraps	2 1/2			80	Steel, No. 1.
4 side-rail brace rods				108	Norway iron.
1 middle rail, 2 pieces, each	2 1/2 by 2 1/2			47 1/2	Steel square root angle.
1 middle-rail axle blocking	3 1/2			8 1/2	Wrought iron.
1 middle-rail understrap	2 1/2			16 1/2	Steel, No. 1.
1 middle-rail brace	3			12	Do.
2 middle-rail brackets	2 1/2 by 2 1/2			6	Steel angles.
6 understrap bolts				16	Norway iron.
6 understrap-bolt nuts					Hexagonal, U. S. standard.
1 cross rail	2 1/2 by 2 1/2			37 1/2	Steel square root angles.
1 doubletree bolt and strap	3 1/2	1 1/2		10 1/2	Soft decarbonized steel.
1 doubletree-bolt nut					Hexagonal, U. S. standard.
1 doubletree-bolt brace	10 1/2			13	Steel, No. 1.
1 pole bolt				5 1/2	Do.
1 pole-bolt handle				7	Norway iron.
2 doubletree stay-chain staples				6	Steel, No. 1.
1 footboard latch	1			2 1/2	Do.
1 footboard-latch strap	2	.06		2	Do.
1 footboard-latch hinge pin				2	Do.
3 footboard-latch strap screws					No. 8.
2 footboard strap hinges without holes	2 1/2			8 by 6 1/2	Wrought iron.
2 footboard compartments					Bronze castings.
1 pole stop	6			7 1/2	Steel, No. 1.
1 back-stay staple	1 1/2			6 1/2	Do.
1 pintle	2 1/2	3		13	Do.
1 pintle	2 1/2	2 1/2		3 1/2	Common tool steel.
2 pintle bolts				6 1/2	Machine bolts, hexagonal heads
2 pintle-bolt nuts					Hexagonal, U. S. standard.
1 pintle key			1 1/2	10	Steel, No. 1.
1 pintle-key chain				13 1/2	Twisted-link steel chain.
1 pintle-key chain ring				4	Decarbonized steel.
1 pintle-key chain eye plate	1 1/2			2 1/2	Steel, No. 1.
2 primer and obturator boxes			3 1/2	20	Standard steel tubing.
2 primer-box bottoms	4			8	Steel, No. 1.
2 primer-box ring-bolt nuts					Hexagonal, U. S. standard.
2 primer-box lids					Bronze castings.
2 primer-box safety latches, right and left					Do.
2 primer-box lid chains				7 1/2	Twisted-link steel chain.
2 primer-box ring bolts	1 1/2	1 1/2		11	Norway iron.
4 primer-box lid-chain rings				21	Wrought-iron wire.
2 primer-box screw bolts			1 1/2	6	Norway iron.
2 ammunition-chest bolts				8	Do.
2 ammunition-chest bolt nuts					Hexagonal, U. S. standard.
Rivets:					
4 rivets, roundhead				1	Norway iron.
14 rivets, roundhead				1 1/2	Do.
12 rivets, roundhead				1 1/2	Do.
12 rivets, roundhead				1 1/2	Do.
5 rivets, roundhead				1 1/2	Do.
2 rivets, roundhead				2	Do.
2 rivets, roundhead				2 1/2	Do.
2 rivets, roundhead				2 1/2	Do.
12 rivets, countersunk head				1 1/2	Do.
4 rivets, countersunk head				1 1/2	Do.
18 rivets, countersunk head				1 1/2	Do.
8 rivets, flathead				8 1/2	Do.
5 rivets, flathead				2 1/2	Do.
5 rivets, flathead				1 1/2	Do.
20 rivets, flathead				1	Do.
1 pole drift bolt				6 1/2	Wrought iron.
1 pole-bolt hole bushing				3 1/2	Brass tubing.
1 pole cover	13	.025		33	Sheet copper, soft.
20 copper tacks					12-ounce copper tacks.
6 brass wood screws				6	No. 6 brass wood screws.
1 neck-yoke stop with hinge eye	2			4	Norway iron.
1 pole ferrule			2	12	Do.
1 pole pad ring	1			8	Steel tubing.
4 pole pad-ring screws			No. 12	1	Wrought iron.
					Iron wood screws.

Correct nomenclature for and list of parts of 3.2-inch field-gun limber—Continued.

Parts of limber.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Metal parts of limber body—Con.</i>					
1 pole-prop body	8½	1		32	Soft decarbonised steel.
1 pole-prop body spring	1	1		4½	Special spring steel.
1 pole-prop hinge piece	1½	1½		6½	Soft decarbonised steel.
1 pole-prop key rivet			1	1½	O. H. steel, No. 1.
1 pole-prop key chain			1	4½	Twisted-link steel chain.
1 pole-prop key	1	1		4	Steel, No. 1.
1 pole-prop key bolt			1	1½	Do.
1 pole-prop key-bolt nut			1		Hexagonal, U. S. standard.
1 pole-prop eye rivet	1	1		3½	Steel, No. 1.
1 pole-prop hook			1	2	Do.
1 pole-prop hook chain			1	8½	Twisted-link steel chain.
1 pole-prop chain staple			1	3	Norway iron.
Pole-prop carrier, 2 pieces (1 right and 1 left hand)					Bronze castings.
8 pole-prop carrier rivets			1	1½	Oval heads.
1 doubletree:					
Metal parts—					
1 doubletree body	6½	1		41½	Steel, No. 1.
1 doubletree top plate	2½	1		3	Do.
1 doubletree bottom plate	2½	1		11	Do.
2 doubletree end and stay hooks	2½	1½		8	Norway iron.
1 doubletree bolt bushing	1½		1½	2½	Common tool steel.
4 doubletree separators				4	Steel, No. 1.
8 doubletree rivets			1		1 wrought-iron pipe.
2 doubletree stay chains			1	8½	Best-quality iron rivets.
2 singletrees:					Straight-link steel chain.
Metal parts for both—					
2 singletree bodies	6	1		65	Steel, No. 1.
2 singletree center eyes	2	1		8	Do.
4 singletree trace hooks	1½	1		2½	Common tool steel.
8 singletree rivets	1½	1		16	Norway iron.
8 singletree rivets			1	4	Common tool steel.
<i>Wooden parts of limber body.</i>					
1 front footboard	8	1		40	Oak.
1 rear footboard	6	1		40	Do.
8 brackets	3½	1½		26	Do.
1 pole:					
Butt end	3½	3½		132	Oak or ash.
Small end	2½	2½			
<i>Leather parts of limber body.</i>					
2 primer-box lid washers	4	1		8	Collar leather.
2 primer-box screw-bolt washers	1½	1		3	Do.
2 wheel washers	4½	1		9	Leather or rawhide.
1 pole pad	6			24½	Collar leather.
1 filling	6			15	Gray felt.
2 neck-yoke pads	4½			16½	Collar leather.
<i>Metal parts of ammunition chest.</i>					
2 handles	1	1		32	Norway iron.
4 corner plates, ends and sides	5½	1		60	Do.
2 corner plates, end and bottom	6	1		64	Soft decarbonised steel.
1 corrugated safe plate	15½	1		18½	Do.
2 front stays	1½	1½		38	Steel, No. 1.
1 back stay	1½	1		16	Do.
2 hinges	1½	1		9	Do.
2 hinge pins	1½		1	43½	Do.
2 hinge-strap covers	2	.026		3½	Do.
86 hinge-strap cover tacks				40	Sheet copper, soft.
1 hasp	1½	1			12-ounce copper tacks.
1 hasp strap	1½	1		17	Steel, No. 1.
1 hasp hinge pin			1	1	Do.
1 hasp-strap covering	2	.026		19	Do.
18 hasp-strap covering tacks					Sheet copper, soft.
2 guard-rail securing plates					12-ounce copper tacks.
1 turn-buckle					Bronze castings.
1 turn-buckle pivot and plate					Do.
1 turn-buckle safe plate	1½	1		2½	Do.
2 turn-buckle pivot-plate rivets			1	3½	Soft decarbonized steel.
1 turn-buckle washer			1	1	Brass wire, soft.
4 paulin-strap plates					Steel, No. 1.
2 paulin-strap buckles	1½				Bronze castings.
50 cut-iron casing nails					Malleable iron, japanned, extra heavy.
					10d. casing nails.

Correct nomenclature for and list of parts of 3.2-inch field-gun limber—Continued.

Parts of limber.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Metal parts of ammunition chest—Continued.</i>					
2 lid props (1 right and 1 left):					
Metal parts—	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
4 lid-prop straps.....					Bronze castings.
2 lid-prop strap hinge pins.....					Do.
2 lid-prop brackets.....					Do.
2 lid-prop bracket pivots.....					Do.
8 lid-prop bracket rivets.....			No. 5	1½	Copper rivets, belt.
2 lid-prop plates.....					Bronze castings.
2 lid-prop plate pivots.....					Do.
4 lid-prop plate rivets.....			No. 5	1½	Copper rivets, belt.
16 rivets, flathead, box rivets.....			1	1½	Norway iron.
2 thimbles for supporting lid prop.....					Bronze castings.
60 rivets, flathead, box rivets.....			1	1½	Norway iron.
80 covers for rivet heads.....	2	.025		62	Sheet copper.
152 tacks, copper.....				116	12-ounce copper tacks.
4 transom rods.....			1	116	Soft decarbonized steel.
90 copper rivets, flathead.....			No. 5	1½	Copper rivets, belt.
130 copper tacks.....			1	1	20-ounce copper tacks.
8 wood screws.....			No. 14	1½	Iron wood screws.
2 wood screws.....			No. 12	1½	Do.
2 wood screws.....			No. 8	1½	Do.
12 wood screws.....			No. 14	2	Do.
20 wood screws.....			No. 14	2½	Do.
10 wood screws.....			No. 12	1	Do.
2 staples.....			1	4	Norway iron.
1 padlock with chain and 2 keys.....					Brass "Bohanan" 77.
<i>Ammunition packing:</i>					
Metal parts—					
4 short middle partitions.....				12	Aluminum casting.
2 short side partitions.....				12	Do.
2 long side partitions.....				20½	Do.
2 long middle partitions.....				20½	Do.
2 circular partitions.....					Do.
2 long partitions.....				20½	Bronze castings
4 medium partitions.....				18½	Do.
11 short partitions.....				10½	Do.
84 partition studs.....					Do.
2 supporting brackets.....				18½	Do.
1 supporting bracket.....				20½	Do.
6 supporting-bracket wood screws.....			No. 6	1	Brass wood screws.
15 supporting-bracket copper rivets.....			No. 8	1½	Copper rivets, belt.
92 brass wood screws.....			No. 12	1½	Brass wood screws.
8 iron wood screws.....			No. 14	3	Iron wood screws.
24 brass wood screws.....			No. 12	1	Brass wood screws.
18 brass nails.....					
<i>Wooden parts of ammunition chest.</i>					
2 ends.....	16½	1½		56	Poplar.
1 side, rear.....	16½	1		47	Do.
1 side, front.....	16½	1½		47	Oak.
2 partitions, cross.....	15½	1		52	Poplar.
3 partitions, center.....	13	1½		64	Do.
2 sides, cover frame.....	4½	1½		96	Do.
2 ends, cover frame.....	4½	2		60	Do.
1 panel cover.....	21½	2		41	White pine.
1 bottom.....	26	1½		46	Poplar.
<i>Ammunition packing:</i>					
Wooden parts—					
1 large box on cover, bottom.....	11	1		19	Do.
2 sides and 1 end.....	2½	1		41	Do.
2 small boxes on cover, bottom.....	8½	1		18	Do.
4 sides, 2 ends.....	2½	1		56	Do.
8 packing cleats.....	4½	1		46	Do.
8 packing-cleat brackets.....	1	1		46	Do.
1 large bottom.....	10½	1		21½	White pine
6 pieces under bottom, each.....	2	2		10	Do.
2 small bottoms.....	10½	1		27½	Do.
8 pieces under bottom, each.....	2	2		10	Do.
11 packing-division pieces, each.....	8	1½		11	Hickory.
6 half packing-division pieces, each.....	1½	1½		11	Do.

Correct nomenclature for and list of parts of 3.2-inch field-gun limber—Continued.

Parts of limber.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Canvas parts of ammunition chest.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
1 cover for lid	32			52	Ball duck, No. 2.
<i>Leather and other parts of ammunition chest.</i>					
4 paulin straps:					Black harness leather.
2 buckle pieces	1½	1		40½	
2 billets	1½			23	
1 canvas cushion:					
1 top	29½			49	Duck, No. 4, drab.
1 bottom	29½			49	Do.
2 side facings	2½			49	Do.
2 end facings	2½			30	Do.
2 welts, top and bottom	1			156	1-inch web, drab.
1 welt corner	1			10	Do.
2 side facings, linings	1½			49	Collar leather.
2 end facings, linings	1½			30	Do.
4 facing loops	1½			5½	Do.
2 welts, top and bottom				156	Chalk line.
1 welt for corner				10	Do.
8 rivets					Bram, No. 10.
8 burs					Do.
Filling					Curled hair, 13 pounds.
<i>Parts to go with limber.</i>					
1 galvanized-iron tool box:					
Metal parts—					
1 body, lid and hasp	9½	.022		37	Gal. S. D. steel.
2 wire-rim reenforces, body and lid .....			.085		Iron wire.
1 handle .....			.148		Do.
1 hasp staple	1	.085		1½	Sheet brass, hard.
1 brass chain				3½	No. 00 safety, brass.
1 brass-chain spring hook .....			.085	8½	Coppered spring-steel wire.
8 rivets					Tinned iron rivets, 8-ounce.
6 burs					Tinned iron rivets, 16-ounce.
Tools carried in galvanized-iron tool box:					
1 iron nut wrench	2½	1		12	O. H. steel, No. 1.
1 1-inch cold chisel	1	{octag.}		8	Common tool steel.
1 hand hammer					
1 small steel punch	1	{octag.}		3½	Do.
1 screw wrench				12	Steel, No. 1.
1 hand bastard file				8	Tool steel.
1 brass oiler, rectangular, sperm					
Metal parts—					
1 body	8½	.018		8½	Sheet brass, hard.
1 bottom reenforce .....			.065	9	Brass wire, hard.
1 spout			7½	2½	O. H. steel, No. 1.
1 screw cap and ring					Brass casting.
1 spout cover and ring					Do.
1 spout-cover chain .....			.049	7	Brass wire, soft.
1 expansion coil spring .....			.065	32	Spring-steel wire.
Wheel-grease can and spatula.					
Metal parts—					
1 sheath for spatula	8	.022		10½	Gal. S. D. steel.
1 body	12½	.035		53	Do.
1 fastening for handle	8	.022		8	Do.
1 screw cap and ring					Brass casting.
1 spatula blade	1½	1		11	Tool steel, cutting.
8 rivets, tinned					Tinned iron rivets, 16-ounce.
8 rivets, tinned					Tinned iron rivets, 32-ounce.
4 rivets for spatula handle			1	2½	Norway iron.
1 neck yoke:					
Metal parts—					
1 pole ring			1	18	S. D. steel.
1 neck-yoke center eye sleeve	8½	1½		6	Do.
2 neck-yoke eye bands	2	1		8	Norway iron.
2 neck-yoke eye rings			1	20	Do.
2 pole-strap eye loops	1½	1		8	Do.
2 pole-strap eye-loop rollers	2	.065		4	O. H. steel, No. 1.
2 martingale staples			1	13	Norway iron.
2 neck-yoke center eye-sleeve rivets			1	11	Do.
2 neck-yoke eye-band rivets			1	11	Do.

Correct nomenclature for and list of parts of 3.3-inch field-gun limber—Continued.

Parts of limber.	Bill of material.				Material.
	W.	T.	D.	L.	
1 neck yoke—continued.					
Wooden part—	Inches.	Inches.	Inches.	Inches.	
1 neck-yoke body.....	24	24		39½	Hickory.
2 watering buckets, canvas.....					
2 rings.....			208	70	S. D. steel.
1 front-sight cover.....					
1 spring.....	1	.028		24	Spring sheet steel.

Correct nomenclature for and list of parts with dimensions of 3.3-inch field caisson.

Parts of caisson, complete.	Bill of material.				Material.
	W.	T.	D.	L.	
	Inches.	Inches.	Inches.	Inches.	
1 LIMBER, COMPLETE.....					Same as gun carriage limber.
1 CAISSON BODY.....					
2 WHEELS.....					Same as wheels for limber.
2 AMMUNITION CRIBS.....					Same as for limber.
<i>Metal parts of caisson body.</i>					
1 axle.....		1	3	76½	Wrought steel.
2 linch washers.....					Same as for limber.
2 linch-washer stop pins.....					Do.
2 linchpins.....					Do.
2 linchpin clasps (right and left).....					Do.
2 linchpin-clasp rivets.....					Do.
2 side rails, each.....	24 by 24	1		86	Best common steel sq. root angle
2 side-rail axle blockings.....	24	1		8	Soft decarbonized steel.
2 side-rail axle-blocking dowels.....			1	14	O. H. steel, No. 1.
2 side-rail bracing axle straps, each.....	8 by 4	1		26½	Best common steel angle.
2 front side-rail braces.....	14			62	Soft decarbonized steel.
1 middle rail, 2 pieces.....each.....	8 by 4			110½	Best common steel sq. root angle
1 middle-rail reenforce, 2 pieces, each.....	24 by 24			214	Best common steel fillet angle.
1 middle-rail axle blocking.....	34	1		44	S. D. steel.
1 middle-rail understrap.....	34	1		17	O. H. steel, No. 1.
2 middle-rail understrap bolts.....			1	64	Norway iron.
2 middle-rail understrap-bolt nuts.....					Hexagonal, U. S. standard.
2 middle-rail braces.....	84	1		24	O. H. steel, No. 1.
2 assembling bolts.....			1½	64	Machine bolts (blank), square heads.
2 assembling-bolt nuts.....					Hexagonal, U. S. standard.
2 assembling-bolt separators.....				9	¼-inch gas pipe.
1 front crossbar.....	2 by 8	1		35	Best common square root angle.
1 rear crossbar.....	2 by 8	1		35	Do.
2 front side-rail brackets.....	24 by 8	1		6	Do.
2 rear side-rail brackets.....	24 by 24	1		6	Do.
2 front middle-rail brackets.....	3 by 4	1		6	Do.
2 rear middle-rail brackets.....	24 by 24	1		6	Do.
1 lunette.....	64	1		17	O. H. steel, No. 1.
1 spare-wheel axle bolster.....			1½	5	Common tool steel.
1 spare-wheel axle body.....	44	1½		28	Iron casting.
2 spare-wheel axle ribs.....	1	1		18	O. H. steel, No. 1.
3 spare-wheel axle-rib rivets.....			1	10	Do.
1 spare-wheel axle washer.....	6			6	S. D. steel.
1 spare-wheel toggle.....	14	1		5	O. H. steel, No. 1.
1 spare-wheel toggle link.....				17	S. D. steel.
1 spare-wheel axle bolt.....			1	44	Do.
1 spare-wheel axle-bolt nut.....					Machine bolt (blank), hexagonal head.
1 front spare-wheel bolster bolt.....				6	Hexagonal, U. S. standard.
1 front spare-wheel bolster nut.....					Norway iron.
1 rear spare-wheel bolster nut.....				84	Hexagonal, U. S. standard.
1 rear spare-wheel bolster washer.....	2	1		2	Norway iron.
1 rear spare-wheel bolster-bolt nut.....			1½		O. H. steel, No. 1.
1 spare pole stirrup.....	14	1		21	Hexagonal, U. S. standard.
1 spare pole-attachment seat and stop.....	64	1		7	O. H. steel, No. 1.
1 spare pole-attachment key bolt.....			1½	84	Do.
				24	Do.

Correct nomenclature for and list of parts, with dimensions of 3.2-inch field caisson—Con.

Parts of caisson, complete.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Metal parts of caisson body—Con.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
1 spare pole-attachment key-bolt chain.			1	18	Wrought-iron wire.
1 spare pole-attachment key-bolt swivel stud.			1	1	O. H. steel, No. 1.
2 shovel attachments.			1	28	S. D. steel.
2 shovel-handle spring catches.	1 1/2	1 1/2		20	Spring steel.
1 pickax attachment (on middle rail).	9	1 1/2		12	O. H. steel, No. 1.
2 pickax attachments (onside rail)	24	1 1/2		12	Do.
1 pickax-handle strap.	2	1 1/2		12 1/2	Do.
1 pickax catch spring.	1	1 1/2		6	Spring steel.
1 spare handspike attachment.			1		Bronze casting.
3 spare handspike-attachment screws.			1	3	Norway iron.
1 spare handspike-attachment seat.	2 1/2	1 1/2		7 1/2	S. D. steel.
1 spare handspike-attachment bolt.	1	1 1/2		6	O. H. steel, No. 1.
1 spare handspike-attachment bolt pivot pin.			1 1/2	1	Do.
1 spare handspike-attachment bolt key.	1 1/2	1 1/2		2	Do.
1 spare handspike-attachment swing bolt key rivet.			1	1	Do.
2 spare handspike-attachment seat rivets.			1	1	Best quality rivet iron.
2 ax and spade board irons.	4 1/2	1		40	O. H. steel, No. 1.
6 wood screws for ax and spade board irons.			No. 12	1	Iron wood screws.
2 ax and spade board side plates.	1	1		15 1/2	O. H. steel, No. 1.
2 backstay staples.	1	1		16	Do.
2 floor rods.			1	78	S. D. steel.
2 floor-rod nuts.			1		Square, U. S. standard.
4 ammunition-chest bolts.			1	18	S. D. steel.
4 ammunition-chest bolt nuts.			1		Hexagonal, U. S. standard.
<i>Rivets:</i>					
4 rivets, half-round heads.			1	1	Soft rivet steel.
4 rivets, half-round heads.			1 1/2	1	Do.
52 rivets, half-round heads.			1 1/2	1	Do.
12 rivets, half-round heads.			1 1/2	1	Do.
32 rivets, half-round heads.			1 1/2	1	Do.
8 rivets, half-round heads.			1	1	Do.
2 rivets, half-round heads.			1	1	Do.
4 rivets, half-round heads.			1	1	Do.
16 rivets, half-round heads.			1	1 1/2	Do.
4 rivets, half-round heads.			1	1	Do.
6 rivets, half-round heads.			1	1	Do.
4 rivets, half-round heads.			1 1/2	1	Do.
11 rivets, half-round heads.			1	1	Do.
3 rivets, flat heads.			1	1 1/2	Do.
3 rivets, flat heads.			1	2 1/2	Do.
3 rivets, flat heads.			1	1 1/2	Do.
20 rivets, flat heads.			1	1	Do.
3 wood screws.			No. 14	1	Iron wood screws.
6 wire nails.				10d.	
2 road brakes:					
<i>Parts for both—</i>					
2 brake arms.	2 1/2 by 2 1/2	1 1/2		33 1/2	Best common square-root angle.
1 brake-arm hinge pin.	2 1/2	1 1/2		31	Do.
2 brake shoes.				8 1/2	O. H. steel, No. 1.
2 brake-shoe screw bolts.			1	2	Bronze castings.
2 hanger straps.	1	1		24	Machine bolts, hexagonal heads.
4 hanger-strap screw bolts.			1	1 1/2	Soft decarbonized steel.
4 hanger-strap screw-bolt nuts.					Machine bolts, hexagonal heads.
2 brake rods:					Hexagonal, U. S. standard.
2 arm attachments.	1 1/2	1 1/2		6	Soft decarbonized steel.
2 arm-attachment bolts.			1	1	Machine bolts, hexagonal heads.
2 springs.	1 1/2	1 1/2		10	Extra spring steel.
4 spring assembling bolts.			1	10	Soft decarbonized steel.
4 spring assembling-bolt nuts.			1		Hexagonal, U. S. standard.
2 attachment rods.	1 1/2	1		12	O. H. steel, No. 1.
2 attachment-rod bolts.		1 1/2		12	Do.
2 attachment-rod bolt nuts.			1		Machine bolts, hexagonal heads.
					Hexagonal, U. S. standard.

Correct nomenclature for and list of parts, with dimensions of 3.2-inch field caisson—Con.

Parts of caisson, complete.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Metal parts of caisson body—Con.</i>					
2 road brakes—Continued.					
Parts for both—Continued.					
2 brake frames, right and left:					
2 frames, right and left.	1	1		12	Bronze castings.
2 ratchet pieces, right and left.					Common tool steel.
4 ratchet-piece rivets.			1	1	Oval heads.
2 lever retaining springs.	1½	1		20	Spring steel.
2 lever stops.	1½	1		12	O. H. steel, No. 1.
4 lever-stop rivets.			1	1	Oval heads.
2 assembling bolts.				5½	Machine bolts, square heads.
2 assembling-bolt nuts.			1	28	Hexagonal, U. S. standard.
2 levers, right and left.	2½	1½		18	Norway iron.
	1½	1		11	O. H. steel, No. 1.
2 brake-lever pivot bolts.			1	2½	Do.
2 brake-lever pivot-bolt nuts.			1	2½	Machine bolts, hexagonal heads.
1 hinge bolster.	5	1		8½	Hexagonal, U. S. standard.
			Outside 1.05, inside 0.74		Soft decarbonized steel.
1 hinge-bolster washer sleeve.					1-inch extra-strong lap-welded steel tubing.
<i>Wood parts of caisson body.</i>					
1 footboard.	10	1		40	Oak.
8 footboard brackets.	1½	1½		80	Do.
1 ax and spade board.	4½	1		43	Do.
<i>Leather parts of caisson body.</i>					
2 wheel washers.					Same as for carriage.
1 ammunition-chest cushion.					Same as for limber.
<i>Tools and implements to be carried on caisson body.</i>					
1 combined tompon and musketeer cover:					
Metal parts—					
1 body.	3½	.025		10½	Soft decarbonized steel.
1 bottom.	3½	.025		3½	Do.
1 top.	3½	.052		5½	Do.
1 eye stud.			1	1	Soft decarbonized steel.
1 eye-stud washer.	1	.072		1	Do.
1 eye-stud ring.			1	7	Do.
14 rivets.			No. 12	1	Brass, flathead.
2 rivets.			8 oz.		Norway iron.
Leather and other parts—					
1 body.	4			12½	Cotton duck, No. 4.
1 end.			6		Do.
1 strap.	1			23	Collar leather.
1 breech cover:					
Leather and other parts—					
1 body.	18			39	Cotton duck, No. 4.
1 binding.	1			75	Cotton webbing.
	4			32	Collar leather.
1 end.			11		Do.
	1			9½	Do.
2 straps.	1			45	Do.
2 buckle pieces.	1			7	Do.
2 side loops.	1			17	Do.
1 maneuvering handspike.					(Right siderail in attachments.)
1 handspike.			2½	49½	Hickory.
1 band.	1	1		2½	Brass casting.
2 shovels, long-handled.					(Beneath side rail in attachments.)
2 spades, short-handled.					(Between ammunition chests.)
2 pickaxes, handled.					Do.
2 axes, handled.					Do.
2 lanterns, railroad.					
1 prolonge (section of picket rope).					
1 spare pole.					(Beneath body in attachments.)
1 spare wheel.					(On spare wheel axle.)
2 paulins.	144			144	Canvas, No. 4.

Correct nomenclature for and list of parts, with dimensions, of 3.3-inch combined forge and battery wagon.

Parts of combined battery wagon and forge.	Bill of material.				Material.
	W.	T.	D.	L.	
	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
1 forge body.....					Same as gun-limber body, excepting 2 primer boxes and lid-locking attachments and adding 2 side-rail brace bolts and 2 side-rail brace-bolt nuts.
1 forge chest.....					Same as caisson ammunition chest except that it is only 11½ inches high. The inner packing for ammunition is removed and the "tool and forge attachments" are added to the interior of the chest.
<i>Metal parts of tools and forge attachments.</i>					
Spring-steel packing for holding smith's tools in place.	12 12	.085 .083		40 24	Spring steel. Do.
134 wood screws for fastening above.			No. 12	1	O. H. steel, No. 1. Iron.
3 bronze lugs for holding forge.					Bronze castings.
9 wood screws for fastening above.			No. 12	1	Iron wood screws.
<i>Wood and other parts for tool and forge attachments.</i>					
Packing for forge.....	3	3		24	Pine.
Packing for crank handle and gear (forge).	4	½		24	Do.
Packing for oil can.....	6	½		6	Beech wood.
Packing for file handle.....	3	1½		5	Do.
Packing for steel square.....	4	½		6	Do.
Lining for horsehoe compartment	12	½		72	Whitewood.
9 wood screws (packing for steel square).			No. 12	1	Iron.
12 wood screws (packing for forge crank and gear).			No. 12	1½	Do.
4 wood screws (packing for forge).			No. 16	3	Do.
2 small canvas bags for nails and small stores:					
Canvas and other parts for each—					
1 body, 2 pieces.....	15			24	Duck, drab, No. 4.
1 bottom.....	8			8	Do.
2 loops.....	2			4½	2-inch webbing, drab.
1 thong.....	1			34½	Rawhide.
1 battery-wagon body.....					Same as caisson body, excepting footboard and parts attached, ax and spade board and parts attached, spare-wheel axle complete, bolster and bolts, spare pole attachments, shovel attachments, pickax attachments, spare handspike attachments, 2 floor rods and nuts, 2 back-stay staples, 4 ammunition-chest bolts and nuts, and adding: 1 anvil attachment, 1 lunette-prop attachment, 1 sledge attachment, 1 battery-wagon chest, wood, and fastenings, complete.
<i>Metal parts of anvil attachment.</i>					
1 front crossbar anvil blocking....	1	1		5½	O. H. steel, No. 1.
1 anvil key bolt.....			1½	4½	Norway iron.
1 anvil key nut.....	1½	1		6	Do.
1 anvil key chain.....					O. H. steel, No. 1.
1 anvil key-chain eye rivet.....				2	Norway iron.
<i>Metal parts of lunette-prop attachment.</i>					
1 lunette-prop attachment (rear)...	1½	1		13½	Steel, No. 1.
1 lunette-prop attachment (front).	1½	1		8	Do.
1 lunette-prop attachment turn-buckle.					Bronze casting.
1 lunette-prop attachment turn-buckle stud.			1½	1½	Steel, No. 1.

Correct nomenclature for and list of parts, with dimensions, of 3.2-inch combined forge and battery wagon—Continued.

Parts of combined battery wagon and forge.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Metal parts of lunette-prop attachment—Continued.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
3 lunette-prop attachment hinge pins.....			$\frac{1}{4}$	6	Steel, No. 1.
2 lunette-prop attachment screws.....			$\frac{1}{2}$	2	Do.
<i>Metal parts of sledge attachment.</i>					
1 sledge attachment.....	14	$\frac{1}{2}$		12	Norway iron.
1 sledge-attachment turn-buckle.....					Bronze casting.
1 sledge-attachment turn-buckle stud.....				14	Do.
2 sledge-attachment hinge pins.....			$\frac{1}{4}$	6	Do.
2 sledge-attachment screws.....			$\frac{1}{2}$	2	Do.
<i>Metal parts of battery-wagon chest.</i>					
2 top rails.....	1	$\frac{1}{2}$		40	Do.
10 top-rail standards.....			$\frac{1}{2}$	210	Do.
2 front side stays.....			$\frac{1}{2}$	48	Do.
2 middle side stays.....	1	$\frac{1}{2}$		6	Do.
16 flathead rivets.....	1	$\frac{1}{2}$		39	Do.
1 tie strap.....	1	$\frac{1}{2}$		6	Do.
2 tie-strap washers.....	1	$\frac{1}{2}$		39	Do.
2 front assembling bolts and plates.....	1	$\frac{1}{2}$		39	Do.
2 front assembling bolt and plate nuts.....	34			20	O. H. steel, No. 1.
1 rear assembling bolt and plate.....	2	$\frac{1}{2}$		40	Norway iron.
1 rear assembling bolt and plate nut.....				12	Do.
12 rivets for assembling bolt and plate.....			$\frac{1}{2}$	2	Wrought iron.
2 hasps.....	14	$\frac{1}{2}$		5	Norway iron.
2 hasp plates.....	2	$\frac{1}{4}$			Hexagonal, U. S. standard.
2 hasp-plate staples.....			$\frac{1}{2}$		
2 hasp hinge pins.....	1	$\frac{1}{2}$		6	Norway iron.
2 rack hinge straps.....			$\frac{1}{4}$	20	Soft decarbonized steel.
2 rack chains.....			$\frac{1}{2}$	72	Do.
2 rack-chain rings.....			$\frac{1}{2}$	6	Norway iron.
2 rack-chain eyebolts.....			$\frac{1}{2}$	6	Soft decarbonized steel.
2 rack-chain hooks.....	$\frac{1}{2}$	$\frac{1}{2}$		10	Do.
1 rack hinge bolt.....			$\frac{1}{2}$	51	Do.
1 rack hinge-bolt nut.....					Hexagonal, U. S. standard.
2 rack hinge-bolt washers.....	14	$\frac{1}{2}$		6	Low steel, No. 1.
4 rack hinge-bolt washer screws.....			No. 11	1	Wood screws.
2 lock chains.....			$\frac{1}{2}$	60	Norway iron.
2 lock-chain staples.....	14	$\frac{1}{2}$		4	Soft decarbonized steel.
2 lock-chain staple plates.....	14	$\frac{1}{2}$		4	O. H. steel, No. 1.
1 partition safe and stay plate.....	$\frac{1}{2}$	.06		13	Do.
2 joint bolts.....			$\frac{1}{2}$	5	Machine bolts (blank), square head.
2 joint-bolt nuts.....				14	Norway iron.
1 anvil safety plate, upper.....	24	.06		17	O. H. steel, No. 1.
1 anvil safety plate, lower.....	14	.06		17	Do.
4 wagon-body lid props:					Bronze castings.
8 lid-prop straps.....					Do.
4 lid-prop brackets.....					Do.
4 lid-prop bracket pivots.....					Do.
4 lid-prop plates.....					Do.
4 lid-prop plate pivots.....					Do.
4 lid-prop strap pins.....					Do.
16 lid-prop bracket rivets.....			No. 5	14	Copper rivets, flat heads.
8 lid-prop plate rivets.....			No. 5	14	Do.
9 strap hinges for wagon lid and doors.....	14	$\frac{1}{4}$		6	Bright iron.
12 rivets for same.....			$\frac{1}{4}$	20	O. H. steel, No. 1.
2 front-door bolts.....					4-inch Dood bolts, brass, with iron fixtures.
2 padlocks with 3 keys each.....					Brass, No. 77 Bohanan, or Ramer .012.
<i>Wood screws:</i>					
120 iron wood screws.....			No. 9	14	(Tool chest compartment partition.)
10 iron wood screws.....			No. 13	24	(Fastening sides to rear posts.)
12 iron wood screws.....			No. 16	24	(Fastening sides to front posts.)
4 iron wood screws.....			No. 16	24	(Fastening front end to partition.)
6 iron wood screws.....			No. 16	24	

Correct nomenclature for and list of parts, with dimensions, of 3.2 inch combined forge and battery wagon—Continued.

Parts of combined battery wagon and forge.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Metal parts of battery-wagon chest—Continued.</i>					
Wood screws—Continued.	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
4 iron wood screws			No. 16	2½	(Fastening end to front posts.)
12 iron wood screws			No. 16	2½	(Fastening rear end to rear posts.)
1 iron wood screw			No. 16	2½	(Fastening front to ridgepiece.)
8 iron wood screws			No. 16	2½	(Fastening top board to ridgepiece.)
14 iron wood screws			No. 16	2½	(Fastening sills to sides.)
5 iron wood screws			No. 16	2½	(Fastening rear cross-bar to end.)
4 iron wood screws			No. 16	2½	(Fastening middle sill to partition.)
5 iron wood screws			No. 14	1	(Fastening grindstone and frame holder.)
8 iron wood screws			No. 12	1½	(Fastening grindstone clamp to lid.)
12 iron wood screws			No. 8	1	(Fastening grindstone leg holders.)
<i>Wood parts of battery-wagon chest.</i>					
2 side sills	8½	1½		144	Oak.
1 middle sill	8½	1½		72	Do.
2 end sills	8½	1½		90	Do.
2 front posts	2	2		18½	Do.
2 rear posts	2	2		41½	Do.
1 ridgepiece	2½	1½		72	Do.
2 sides (for body)	20	1		144	Whitewood.
1 rear end (for body)	24	1		45	Do.
1 front end (for body)	10½	1		45	Do.
1 top board	6	1		72	Do.
1 cross partition	18	1		44	Do.
1 tool-chest compartment partition	18	1		80	Do.
1 tool-chest compartment cover	32	1		44	Do.
4 lid rails	4	1		288	Do.
6 lid crosspieces	4	1		27½	Do.
4 lid panels	14½	1		124	Do.
2 front-door rails	8½	1		90	Do.
2 front-door end crosspieces	8½	1		26	Do.
1 front-door middle crosspiece	3½	1		13	Do.
2 front-door panels	7	1		60	Do.
1 bottom	45	1		72	Do.
1 grindstone-frame packing	16½	1½		18½	Pine wood.
1 grindstone-frame clamp	4½	1		11½	Oak.
2 sides, forage rack	8½	1		45	Do.
8 bars, forage rack	24	1		146	Do.
1 middle rail, forage rack	8	1		30½	Do.
<i>Canvas for top of battery-wagon chest.</i>					
1 piece canvas	50			76	No. 2 cotton sail duck.
1 piece canvas	10			76	Do.
<i>Metal parts of saddler's chest.</i>					
1 lid band	1	1½		100	Soft decarbonized steel.
4 corner pieces	3½	1		48	Do.
2 chest hinges	2	1½			Iron.
2 chest handles					Iron slash chest handles, "Carbine."
1 chest lock with 2 keys	2½			4	Iron.
2 lid stay chains			1	130	Norway iron.
Metal packing in chest	6	.085		12	Sheet spring steel.
Wood screws:					
44 iron wood screws			No. 8	1	(For lid bands.)
40 iron wood screws			No. 10		(For corner pieces.)
12 iron wood screws			No. 11		(For handles.)
16 iron wood screws			No. 8		(For hinges.)
4 iron wood screws			No. 11		(For lid frame.)
4 iron wood screws			No. 8		(For lid stay chains.)
2 iron wood screws			No. 14	2	(Fastening ends to partition.)
4 iron wood screws			No. 14	1½	(Fastening bottom to partition.)
7 iron wood screws			No. 6	1	(For lock.)
<i>Wooden parts of one saddler's chest.</i>					
2 side pieces, for lid	8	1		60	Whitewood.
2 end pieces, for lid	8	1		42	Do.
1 panel, for lid	15½	1		24½	Do.
2 sides, for body	11½	1		60	Do.

Correct nomenclature for and list of parts, with dimensions, of 3.2 inch combined forge and battery wagon—Continued.

Parts of combined battery wagon and forge.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Wooden parts of one saddler's chest—Continued.</i>					
2 ends, for body.....	<i>Inches.</i> 11½	<i>Inches.</i> 1	<i>Inches.</i>	<i>Inches.</i> 42	Whitewood.
1 bottom, for body.....	19½	1		28½	Do.
1 partition.....	10½	½		27½	Do.
Wooden packing in chest.....	12	½		24	Cherry.
2 small canvas bags for small stores					
Canvas and other parts for each—					
1 body, 2 pieces.....	9½			22½	Duck, drab, No. 4.
1 bottom.....	6½			6½	Do.
2 loops.....	2			4½	2-inch webbing, drab.
1 thong.....	½			34½	Rawhide.
<i>Metal parts of carpenter's chest.</i>					
1 lid band.....	1	½		100	Soft decarbonized steel.
4 corner pieces.....	3½	½		48	Do.
2 chest hinges.....	2	½			Iron.
2 chest handles.....					Iron, flush handles.
1 chest lock with 2 keys.....	2½			4	Iron.
1 chisel clamp:					
1 arm.....					Bronze casting.
1 turn-buckle.....					Do.
1 turn-buckle pivot and plate.....					Do.
1 hinge bracket.....					Do.
1 hinge pin.....			½	1½	Brass wire, hard.
1 lid prop:					
2 straps.....					Bronze castings.
1 bracket.....					Do.
1 bracket pivot pin.....			½	½	Brass wire, hard.
1 strap hinge pin.....			½	½	Do.
1 pivot stud.....					Bronze casting.
1 pivot-stud washer.....	1	.048		1	Sheet brass.
Packing for holding tools in chest.	6	.085		30	Sheet spring steel.
	6	½		24	Do.
Wood screws:					
44 iron wood screws.....			No. 8	1	(For lid band.)
40 iron wood screws.....			No. 10	1	(For corner plates.)
12 iron wood screws.....			No. 11	1	(For handles.)
16 iron wood screws.....			No. 8	1	(For hinges.)
4 iron wood screws.....			No. 11	1	(For lid frame.)
7 iron wood screws.....			No. 6	1	(For lock.)
4 iron wood screws.....			No. 12	1	(For chisel-clamp hinge bracket and turn-buckle pivot plate.)
2 brass wood screws.....			No. 12	1	(For lid-prop bracket.)
<i>Wooden parts of carpenter's chest.</i>					
2 side pieces, for lid.....	3	1		60	Whitewood.
2 end pieces, for lid.....	3	1		42	Do.
1 panel, for lid.....	15½	1		24½	Do.
2 sides, for body.....	11½	1		60	Do.
2 ends, for body.....	11½	1		42	Do.
1 bottom, for body.....	19½	1		28½	Do.
2 small canvas bags for small stores (same as in saddler's chest).					
<i>Metal parts of grindstone frame.</i>					
4 frame legs.....each.....			½	30	Gas pipe, iron.
4 frame leg feet.....			½	4½	Soft decarbonized steel.
4 frame sides.....			½	39	Gas pipe iron.
4 frame corner pieces.....					Brass castings.
2 journal boxes.....					Do.
2 journal-box caps.....					Do.
2 journal-box cap screws.....	½	½		2	O. H. steel, No. 1.
2 journal-box set screws.....			½	2½	Do.
1 crank shaft.....			1	14½	Do.
1 crank arm.....	1½	1		5½	Do.
1 crank-handle pin.....			½	5½	Soft decarbonized steel.
1 grindstone bushing with fixed flange.....					Brass casting.
1 grindstone bushing with fixed flange key.....	½	½		1½	O. H. steel, No. 1.
1 grindstone-bushing key chain.....				3½	No. 00 brass safety chain.
1 grindstone-bushing key-chain ring.....			.12	2	Brass wire.
1 grindstone-bushing key-chain stud.....			½	1	Brass casting.

Correct nomenclature for and list of parts, with dimensions, of 3.2-inch combined forge and battery wagon—Continued.

Parts of combined battery wagon and forge.	Bill of material.				Material.
	W.	T.	D.	L.	
<i>Metal parts of grindstone frame—Continued.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
1 grindstone-bushing stay pin.....			$\frac{1}{2}$	$\frac{1}{2}$	O. H. steel, No. 1.
1 grindstone loose flange.....				$\frac{1}{2}$	Brass casting.
1 crank key.....			.165	$\frac{1}{2}$	Steel wire, S. D. S.
1 spanner wrench for flange.....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	Soft decarbonized steel.
					Do.
<i>Wooden part for grindstone frame.</i>					
1 crank handle.....	$\frac{1}{2}$	$\frac{1}{2}$		$\frac{4}{4}$	Maple or beech.
<i>Implements and equipments.</i>					
Sperm-oil can:					
1 body.....	8			18	X tin.
1 bottom.....	8			8	Do.
1 top.....	8			8	Do.
1 screw ring and cap.....					Brass casting.
Solder, soft.....					2 ounces soft solder.
Coal-oil can:					
1 body.....	6 $\frac{1}{2}$	.0253		39	Galvanized sheet iron.
1 bottom and top.....	18 $\frac{1}{2}$	.0253		27	Do.
1 handle.....			.303	18	Coppered iron wire.
1 bottom rim reinforce.....			.148	40	Do.
1 screw ring and cap.....					Brass casting.
4 screw-ring rivets.....			No. 9	$\frac{1}{2}$	Brass rivets.
1 screw-cap staple and eye.....			.083	8	Brass wire, hard.
2 hinge plates for handle.....	2	.109		2	Sheet brass, hard.
8 hinge-plate rivets.....			No. 8	$\frac{1}{2}$	Brass rivets.
1 spout.....					Brass casting.
1 spout screw cover.....					Do.
1 spout screw-cover chain.....				$\frac{2}{2}$	No. 00 safety chain, brass.
3 spout rivets.....			No. 10	$\frac{1}{2}$	Brass rivets.
Solder, soft.....					$\frac{1}{2}$ ounce.
2 galvanized-iron water buckets:					
Material for one—					
1 body.....	36	.065		10	Galvanized sheet steel.
1 bottom.....	12	.065		12	Do.
2 ears.....	8	.109		7	Do.
1 handle.....			$\frac{1}{2}$	21	Soft decarbonized steel.
6 rivets for ears.....					Iron, tinned, 6-pound.
6 rivets for seams.....					Iron, tinned, 8-pound.
16 rivets for bottom.....					Iron, tinned, 2-pound.
1 coal bag:					
Canvas and other parts—					
1 body.....	$\frac{30}{24}$			$\frac{504}{504}$	Duck, drab, No. 4.
1 bottom.....	17 $\frac{1}{2}$			17 $\frac{1}{2}$	Do.
8 loops.....	2			22 $\frac{1}{2}$	Do.
1 closing and lashing cord.....			$\frac{1}{2}$	85 $\frac{1}{2}$	2-inch webbing, drab.
1 prolonge (section of picket rope).....					Braided sash cord.
2 lanterns, railroad.....					Same as carriage.
1 sledge hammer.....	2 $\frac{1}{2}$	2 $\frac{1}{2}$		6	Same as calson.
					Common tool steel.

Correct nomenclature for and list of parts, with dimensions, of artillery store wagon.

Parts of wagon.	Bill of material.				Material.
	W.	T.	D.	L.	
	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
1 front truck.....					
1 rear truck.....					
1 body.....					
1 top.....					
FRONT TRUCK.					
2 wheels.....			48.76		Archibald patent, U. S. standard pattern. Same as 3.2-inch field gun carriage, except diameter, which is 48.76 inches.
<i>Metal parts.</i>					
1 axle, tubular.....		$\frac{1}{2}$	3	75 $\frac{1}{2}$	Wrought steel.
2 lynch washers.....	4 $\frac{1}{2}$	$\frac{1}{2}$		9	O. H. steel, No. 1.

Correct nomenclature for and list of parts, with dimensions, of artillery store wagon—C'V'd.

Parts of wagon.	Bill of material.				Material.
	W.	T.	D.	L.	
FRONT TRUCK—continued.					
Metal parts—Continued.					
	Inches.	Inches.	Inches.	Inches.	
2 linch washers.....			.562	2½	Sole leather.
2 linch-washer stop pins.....				9	O. H. steel, No. 1.
2 linch washers.....	1.25	1½		13	O. H. steel, No. 2.
2 linchpin clasp, right and left.....		.812		5	Spring steel.
2 linchpin clasp rivets.....			.625	7½	O. H. steel, No. 1.
1 kingbolt seat clip.....	2½			5½	Do.
1 kingbolt seat-clip yoke.....	1½				Do.
2 kingbolt seat-clip nuts.....			.625		Hexagonal, U. S. standard, hot-pressed.
2 front-axle clips (inner).....	1½	.19		47	O. H. steel, No. 1.
2 front-axle clip yokes (inner)....	1½	2		11½	Do.
4 front-axle clip nuts.....					O. H. steel, No. 1.
2 front-axle clips (intermediate), right and left.....	1½			23	Hexagonal, U. S. standard, hot-pressed.
2 front-axle clip yokes, right and left.....	1½	1½		15½	O. H. steel, No. 1.
4 front-axle clip nuts (blank).....					Do.
2 front-axle clips (outer).....	1½	.19		80	Hexagonal, U. S. standard, hot-pressed.
4 front-axle clip nuts.....				15	O. H. steel, No. 1.
1 kingbolt.....			1½	13½	Do.
1 kingbolt bolster plate (upper)...	3½	1		7	Do.
2 kingbolt bolster-plate bolts.....				12	Do.
2 kingbolt bolster-plate bolt washers.....					Do.
2 kingbolt bolster-plate bolt nuts (blank).....					Hexagonal, U. S. standard, hot-pressed.
1 kingbolt bolster plate (lower)....	3½			18½	O. H. steel, No. 1.
4 kingbolt bolster-plate wood screws.....			No. 20	8	Iron, flathead.
4 front bolster plate to take wear of reach irons.....	1½	19		44	O. H. steel, No. 1.
4 bolts for above plates.....			.312	24	Do.
4 nuts for above bolts.....			.312	24	Hexagonal, U. S. standard, hot-pressed.
2 straps for bolster for fifth wheel (side bearings).....	1½	1½		10	O. H. steel, No. 1.
4 flathead wood screws for above.....			No. 20	2	Iron.
2 ax stops (head).....	1½	.093		6	O. H. steel, No. 1.
6 flathead wood screws for above.....			No. 8	1	Iron.
1 fifth wheel.....	1½			100	O. H. steel, No. 1.
2 fifth-wheel flathead wood screws.....			No. 20	8	O. H. steel, No. 1.
2 fifth-wheel rear-circle bar rivets.....				8	Do.
2 fifth-wheel front-circle bar bolts.....				8	Do.
2 fifth-wheel support spool bolts.....				14½	Do.
4 fifth-wheel bolt nuts.....					Hexagonal, U. S. standard, hot-pressed.
2 fifth-wheel support spools.....			2	4½	O. H. steel, No. 1.
1 rear-circle bar rub iron.....	2			35	Do.
3 rear-circle bar rub-iron rivets.....				9	Do.
2 rear-circle bar bolts (carriage).....				6	Do.
2 front-circle bar bound bolts (carriage).....				5	Do.
1 pole stop.....	2½			11	Do.
4 pole-stop bolts (carriage).....				4½	Do.
2 bound irons.....	2½			110	Do.
6 bound-iron rivets.....			.312	30	Do.
1 pole key.....				17½	Do.
1 pole-key strap.....	4½	.312		34½	Do.
2 pole-key strap bolts (machine).....				4	Do.
2 pole-key strap bolts (machine).....				4	Do.
1 doubletree bolt brace.....	2½			9	Do.
1 doubletree bolt and strap.....	4½	1½		10	Do.
1 doubletree bolt nut (blank).....					Hexagonal, U. S. standard, hot-pressed.
4 doubletree bolts and strap bolts (machine).....				4½	O. H. steel, No. 1.
2 bound braces (right and left)....	2			96	Do.
2 doubletree chain hooks (right and left).....	1½			24	Do.
2 doubletree chain hooks (right and left).....	1½			18	Do.
2 bound sway-bar bolts (machine).....				26	Do.
2 straps for rear end of hounds (right and left).....	8½			5½	Do.
				17	Do.

Correct nomenclature for and list of parts, with dimensions, of artillery store wagon—
Continued.

Parts of wagon.	Bill of material.				Material.
	W.	T.	D.	L.	
FRONT TRUCK—continued.					
Metal parts—Continued.					
	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
2 bolts (carriage) for above strap.....			.312	3½	O. H. Steel, No. 1.
2 bolts (carriage) for above strap.....				Do.	Do.
1 sway-bar iron.....	2½			55	Do.
3 sway-bar iron rivets.....			.312	12	Do.
2 pound brace straps (right and left).	2	.24		120	Do.
Doubletree:					
1 doubletree body.....	6½			41½	Do.
1 doubletree-body top plate.....	2½			5	Do.
1 doubletree-body bottom plate.....	2½	.562		11	Do.
2 doubletree-body ends and stay hooks.....	2½	1½		8	Do.
1 doubletree bolt bushing.....	1½		1½	2½	Common tool steel.
4 doubletree separators.....				4	O. H. steel, No. 1.
2 doubletree stay chains.....				27½	0.50 wrought-iron pipe.
2 doubletree rivets, countersunk heads.....				1.312	35 links, 0.25-inch stock.
2 doubletree rivets, oval heads.....					Burden's best rivet iron.
2 doubletree rivets, oval heads.....				14	Do.
2 doubletree rivets, oval heads.....				2½	Do.
2 singletree bodies.....	6			65	O. H. steel, No. 1.
2 singletree center eyes.....	2			8	Do.
	1½			2½	Common tool steel.
4 singletree trace hooks.....	1½			16	O. H. steel, No. 1.
6 singletree rivets, oval heads.....				4	Common tool steel.
2 singletree rivets, countersunk heads.....				1½	Burden's best rivet iron.
				1.312	Do.
1 pole butt rivet.....				5½	O. H. steel, No. 1.
1 pole butt rivet burr.....	1½			1½	Do.
1 pole bolt-hole bushing.....			.812	3½	Brass tubing.
1 pole cover.....	9½	5		33	Copper.
46 pole-cover copper tacks.....				1	12-ounce copper tacks.
6 pole-cover brass screws.....			No. 6	6	Brass.
1 neck-yoke stop with hinge eye.....	2½		.937	6	O. H. steel, No. 1.
				4	Do.
2 neck-yoke stop rivets.....				3½	Norway iron.
1 pole ferrule.....			1.93x2½	12½	Steel tubing, lap weld.
1 pole pad ring.....	1			8	O. H. steel, No. 1.
4 pole pad-ring flathead wood screws.....			No. 12	1	Iron.
4 pole-prop hinge pieces.....	1½	1½		6	O. H. steel, No. 1.
4 pole-prop hinge-piece bolts.....			.562	2	Blank bolts, hexagonal heads.
4 pole-prop hinge-piece bolt nuts.....			.437		Hexagonal, U. S. standard, hot-pressed.
2 pole-prop legs.....	8½			33	O. H. steel, No. 1.
1 pole-prop leg bolt.....			.562	1½	Blank bolt, hexagonal head.
1 pole-prop leg-bolt nut.....			.437		Hexagonal, U. S. standard, hot-pressed.
1 pole-prop leg spring.....				5	Spring steel.
2 pole-prop leg-spring rivets, countersunk head.....			.187	4	Norway iron.
1 pole-prop eye rivet.....				8	O. H. steel, No. 1.
2 pole-prop eye-rivet burr.....				4	Do.
1 pole-prop eye hook.....				2½	Do.
1 pole-prop eye-hook link.....			.156	4	Do.
1 pole-prop eye-hook chain (twist link).				7½	0.125 stock.
1 pole-prop eye-hook chain staple.....			.156	3	O. H. steel, No. 1.
Neck yoke:					
1 neck-yoke pole ring.....				18	Do.
1 neck-yoke center-eye sleeve.....	3½	1½		6	Do.
2 neck-yoke center-eye sleeve rivets.....			.187	11	Do.
2 neck-yoke eye bands.....	2			8	Do.
2 neck-yoke eye-band rivets.....			.187	7	Do.
2 neck-yoke eye-band rings.....				20	Do.
2 neck-yoke eye-band-ring eye loops.....	1½			8	Do.
2 neck-yoke eye-band-ring eye-loop rollers.....		.066		4	Do.
2 neck-yoke martingale staples.....				13	Do.
2 neck-yoke end-pad flathead wood screws.....			No. 12	1½	Iron.
2 wire staples for above wood screws.....			.078	10	Hard coppered wire.

Correct nomenclature for and list of parts, with dimensions, of artillery store wagon—
Continued.

Parts of wagon.	Bill of material.				Material.
	W.	T.	D.	L.	
FRONT TRUCK—continued.					
Wood parts.					
1 upper bolster	Inches.	Inches.	Inches.	Inches.	First-quality hickory.
1 lower bolster	4½	6	.....	52	
1 axle stock	4	4½	.....	40	Do.
2 bounds	9	4	.....	52	Do.
1 sway bar	3	3	.....	120	Do.
1 rear-circle bar	3	3	.....	56	Do.
1 front-circle bar	2½	3	.....	50	Do.
1 pole	2	3	.....	84	Do.
1 neck yoke	4	4	.....	126	First-quality white oak.
	3	3	.....	.....	First-quality hickory.
Leather parts.					
1 leather pole pad					
0.50 pound black collar leather, back 8 to 8½ ounces.					
0.33 pound russet collar leather, back 7 to 8 ounces.					
0.0075 pound shoe thread, H. B., No. 10.					
0.06 ounce black wax					
0.06 yard gray felt, 60-inch					
2 leather neck-yoke pads					
0.40 pound scrap leather					
0.165 ounce linen thread, black, No. 40.					
REAR TRUCK.					
2 wheels			57½		Archibald patent, U. S. standard pattern, same as 3.2-inch field gun carriage.
Metal parts.					
1 axle, tubular		½	8	75½	Wrought steel.
2 linch washers	4½	½		9	O. H. steel, No. 1.
2 linch washers, sole leather, 0.33 pound.					
2 linch-washer stop pins .....			.562	24	Do.
2 linchpins	1½	1½		9	Do.
2 linchpin clamps, right and left	1	.312		12	Spring steel.
2 linchpin-clamp rivets .....	.....	.....		6	O. H. steel, No. 1.
3 bolster axle clips	1½	.187		36	Do.
2 bolster axle-clip yokes	1½	.....	.....	63	Do.
6 bolster axle-clip nuts (blank)				12	Do.
2 end axle clips	1½	.187		30	Hexagonal, U. S. standard, hot- pressed.
4 end axle-clip nuts .....			.....	16	O. H. steel, No. 1.
			.....		Do.
2 reach braces, right and left	2	½		23	Hexagonal, U. S. standard, hot- pressed.
	1½	.....	.....	26	O. H. steel, No. 1.
2 reach-brace bolts .....			.....	6½	Do.
2 reach-brace bolt nuts (blank) .....			.....	20	Do.
			.....		Hexagonal, U. S. standard, hot- pressed.
1 reach iron	8	.....		102	O. H. steel, No. 1.
3 reach-iron bolts (carriage)	2	.....		10	Do.
1 reach-iron rivet .....			.....	8	Do.
1 front-end reach strap	2	.187		4½	Do.
1 front-end reach-strap rivet .....			.....	24	Do.
1 front-end reach-strap bolt (ma- chine).			.....	6	Do.
			.....	4½	Do.
1 front-end top reach strap	2	.187		15	Do.
2 front-end top reach-strap rivets .....			.312	8	Do.
1 chafe iron	4	.....		8	Do.
2 chafe-iron bolts (carriage) .....			.....	8	Do.
1 shovel-attachment spring	1.437	.062		12	Spring steel.
1 shovel-attachment spring bolt (carriage).			.....	8½	O. H. steel, No. 1.
1 shovel-attachment bolt washer .....			.....	.....	Do.
1 shovel-spring angle iron	1 by 1½	.....		6	Do.
2 shovel-spring angle-iron flat- head machine screws.			.312	1	Do.
2 pickax-attachment springs	1½	.062		10	Spring steel.
2 pickax-attachment spring bolts (carriage).			.....	24	O. H. steel, No. 1.

Correct nomenclature for and list of parts, with dimensions, of artillery store wagon—
Continued.

Parts of wagon.	Bill of material.				Material.
	W.	T.	D.	L.	
REAR TRUCK—continued.					
Metal parts—Continued.					
2 pickax-attachment hound side attachments, right and left.	<i>Inches.</i> 1½	<i>Inches.</i> .098	<i>Inches.</i>	<i>Inches.</i> 9	O. H. steel, No. 1.
6 flathead wood screws for above.	.....	.....	No. 9	1	Iron.
2 pickax hound attachments.	1½	.098	.....	8	O. H. steel, No. 1.
6 pickax hound-attachment flat-head wood screws.	.....	.....	No. 9	1	Iron.
1 pickax reach attachment.	1½	½	.....	9½	O. H. steel, No. 1.
2 pickax reach-attachment bolts (machine).	.....	.....	.....	3	Do.
1 pickax reach-attachment flat-head wood screw.	.....	.....	No. 16	1½	Iron.
1 pickax reach-attachment separator, ½-inch pipe (iron).	.....	.....	.....	1½	Wrought iron.
Wood parts.					
1 bolster.	4	6	.....	52	First-quality hickory.
1 axle stock.	4	4	.....	52	Do.
1 reach.	4	2½	.....	112	Do.
2 hounds.	8	2½	.....	66	Do.
BODY.					
Metal parts.					
Brake gear:					
1 brake lever (foot).	{ 2½	½	.....	20	O. H. steel, No. 1.
1 brake-lever bolt.	1½	.....	.....	6	Do.
1 brake-lever fulcrum thrust rod.	1½	1½	.....	2½	Do.
2 brake-lever fulcrum thrust-rod bolts (carriage).	.....	.....	.....	12	Do.
2 brake-lever hanger pieces.	.....	.....	.....	5	Do.
4 brake-lever hanger-piece bolts (carriage).	1½	½	.....	24	Do.
1 brake-lever rack plate.	.....	.812	.....	1½	Do.
3 brake-lever rack-plate bolts (carriage).	1½	.187	.....	10½	Do.
1 brake-lever guard plate.	.....	.512	.....	1½	Do.
3 brake-lever guard-plate flat-head wood screws.	2½	½	.....	10½	Do.
1 brake-lever spring.	.....	No. 10	.....	1	Iron.
2 brake-lever spring bolts (carriage).	1½	.....	.....	8	Spring steel.
1 brake-lever reach rod, first section.	.....	.24	.....	1½	O. H. steel, No. 1
2 brake-lever reach-rod bolts (machine).	1½	1½	.....	10	Do.
1 brake-lever reach rod, second section.	.....	.....	.....	1½	Do.
1 brake-lever reach-rod bolt (machine).	{ 1½	1	.....	5	Do.
2 brake-lever reach rods, third section.	.....	.....	.....	57	Do.
2 brake-lever reach-rod nuts.	.....	.....	.....	1½	Do.
2 brake (wood) lever eyebolts.	.....	.....	.....	8	Do.
4 brake (wood) lever eyebolt washers.	1½	.....	.....	83	Do.
2 brake (wood) lever eyebolt nuts (blank).	.....	.....	.....	.....	Hexagonal, U. S. standard, hot-pressed.
2 brake (wood) lever rivets, flathead.	.....	.....	.....	8	O. H. steel, No. 1.
2 brake (wood) lever rivet burrs.	.....	.....	.....	.....	Do.
2 brake (wood) lever fulcrum bolts (carriage).	.....	.....	.....	.....	Hexagonal, U. S. standard, hot-pressed.
2 brake (wood) lever bracket irons.	.....	.....	.....	2½	Norway iron.
4 brake (wood) lever bracket bolts (carriage).	3	.187	.....	6	O. H. steel, No. 1.
2 brake (head) bolts (carriage).	.....	.....	.....	24	Do.
2 brake (head) bolt washers.	.....	.....	.....	3½	Do.
2 brake shoes.	.....	.....	.....	5	Do.
4 brake-shoe bolts.	2½	.....	.....	.....	Do.
4 brake-shoe bolt washers.	.....	.....	.....	9½	Do.
1 brake-lever (reach) rod support.	1½	.....	.....	18	Do.

*Correct nomenclature for and list of parts, with dimensions, of artillery store wagon—
Continued.*

Parts of wagon.	Bill of material.				Material.
	W.	T.	D.	L.	
BODY—continued.					
<i>Metal parts—Continued.</i>					
Brake gear—Continued.	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
2 brake-lever (reach) rod support bolts (carriage).	.....	.312	.....	3½	O. H. steel, No. 1.
2 brake (wood) lever (fulcrum) irons.	2½	½	.....	8½	Do.
4 brake (wood) lever (fulcrum) irons.	2½	½	.....	16½	Do.
12 brake (wood) lever flathead wood screws.	.....	.....	No. 9	1½	Iron.
2 footboard (support) irons	2	.312	.....	44	O. H. steel, No. 1.
4 footboard (support) bolts (carriage).	.....	.....	½	8½	Do.
8 footboard (support) bolts (carriage).	.....	.....	½	2	Do.
2 footboard (support) bolts (carriage).	.....	.....	½	1½	Do.
2 footboard (upper brace) irons.	1	½	.....	26	Do.
2 footboard (upper brace) iron bolts (carriage).	.....	.....	½	2½	Do.
4 footboard (upper brace) iron bolts (carriage).	.....	.....	½	1½	Do.
2 footboard (upper brace) iron flathead wood screws.	.....	.....	No. 14	1½	Iron.
2 footboard (lower brace) irons	1	½	.....	26	O. H. steel, No. 1.
6 footboard (lower brace) iron flathead wood screws.	.....	.....	No. 14	1½	Iron.
1 footboard (edge) iron	1½	½	.....	84	O. H. steel, No. 1.
10 footboard (edge) iron flathead wood screws.	.....	.....	No. 12	1½	Iron.
2 seat-back hinges	1	1	.....	22	O. H. steel, No. 1.
2 seat-back hinge rivets	.....	.....	1	2½	Do.
4 seat-back hinge bolts (carriage).	.....	.....	½	1½	Do.
2 seat-back hinge bolts (carriage).	.....	.....	½	1½	Do.
6 seat-back hinge rivets (flathead).	.....	.....	½	1½	Norway iron.
2 body arch irons	2	.312	.....	82	O. H. steel, No. 1.
4 body arch iron nuts (blank)	.....	.....	½	8	Do.
4 body arch iron washers	.....	.....	½	.....	Hexagonal, U. S. standard, hot-pressed.
16 body arch iron flathead rivets.	.....	.....	½	2½	O. H. steel, No. 1.
16 body arch iron flathead burrs.	.....	.....	½	.....	Norway iron.
2 upper rave irons	4½	½	.....	9½	O. H. steel, No. 1.
10 upper rave iron flathead wood screws.	.....	.....	No. 8	1	Do.
16 upper bow staples	1½	.22	.....	58	O. H. steel, No. 1.
32 upper bow-staple flathead wood screws.	.....	.....	No. 14	1½	Iron.
16 lower bow staples	½	.22	.....	88	O. H. steel, No. 1.
32 lower bow-staple flathead wood screws.	.....	.....	No. 14	1½	Iron.
2 seat-box hinges	6	.098	.....	18	O. H. steel, No. 1.
8 flathead wood screws	.....	.....	No. 9	5½	Do.
4 flathead wood screws	.....	.....	No. 9	1½	Iron.
4 flathead rivets	.....	.....	½	1½	Do.
1 seat-box hasp	1½	.098	.....	12	Norway iron.
4 seat-box hasp flathead wood screws.	.....	.....	No. 8	1½	O. H. steel, No. 1.
1 seat-box hasp staple	1½	.098	.....	1½	Do.
4 flathead wood screws	.....	.....	No. 8	2	O. H. steel, No. 1.
1 seat-box padlock chain staple	.....	.....	No. 8	3	Do.
1 seat-box hasp padlock (Yale & Towne), No. 8064, 1½-inch, steel shackle, with chain.	.....	.....	.187	1	Iron.
1 ax-attachment hasp	1½	.098	.....	8	O. H. steel, No. 1.
4 ax-attachment hasp flathead wood screws.	.....	.....	No. 8	20	Do.
2 ax-attachment hasp staples	1½	.098	.....	24	Do.
8 flathead wood screws	.....	.....	No. 8	1	Iron.
2 ax-attachment hasps:					
Metal parts for both—					
2 rings	.....	.....	.187	4	O. H. steel, No. 1.
2 chains, 6 links each	.....	.....	½	44	Do.
2 staples	.....	.....	.187	54	Do.
2 hooks	.....	.....	½	8	Do.

*Correct nomenclature for and list of parts, with dimensions, of artillery store wagon—
Continued.*

Parts of wagon.	Bill of material.				Material.
	W.	T.	D.	L.	
BODY—continued.					
Metal parts—Continued.					
2 ax-attachment stops.....	1½	.093		6	O. H. steel, No. 1.
4 flathead wood screws.....			No. 8	1	Iron.
2 spade-attachment hasps.....	1½	.093		28	O. H. steel, No. 1.
8 flathead wood screws.....			No. 8	4	Do.
2 spade-attachment hasp staples.....	1½	.093		1	Iron.
8 flathead wood screws.....			No. 8	4	O. H. steel, No. 1.
2 spade-attachment hasps.....				3	Do.
Metal parts for both—					
2 hooks.....			1	7½	O. H. steel, No. 1.
2 rings.....			.187	5	Do.
2 chains, 5 links each.....				4½	Do.
2 staples.....			.187	5½	Do.
8 body arch bolts (special).....				124	Do.
8 body arch-bolt washers.....					Do.
8 body arch-bolt nuts.....					Hexagonal, U. S. standard, hot-pressed.
4 body arch bolts (special).....				32	O. H. steel, No. 1.
4 body arch-bolt washers.....					Do.
4 body arch-bolt nuts.....					Hexagonal, U. S. standard, hot-pressed.
2 corner-post joint bolts (special).....				8½	O. H. steel, No. 1.
2 corner-post joint-bolt washers.....					Do.
2 corner-post joint-bolt nuts (blank).....					Hexagonal, U. S. standard, hot-pressed.
2 body boot hooks.....	1	1		24	O. H. steel, No. 1.
4 body boot hook flathead wood screws.....			No. 8	1	Iron.
2 rocker (bolster) brackets.....	2	.187		34	O. H. steel, No. 1.
4 rocker (bolster) bracket bolts (carriage).....			.312	3	Do.
2 body front-bolster bolts (carriage).....				6	Do.
2 body rear-bolster bolts (carriage).....				6½	Do.
2 body rear-bolster washers (special).....			1½	2	Do.
2 water-barrel bracket bolts (carriage).....			.312	3½	Do.
2 water-barrel bracket-bolt washers.....			.312		Do.
2 water-barrel bracket bolts (carriage).....				5½	Do.
2 water-barrel bracket-bolt washers.....					Do.
4 water-barrel bracket flathead wood screws.....			No. 16	2	Iron.
300 flathead wood screws.....			No. 12	1½	Do.
24 flathead wood screws.....			No. 12	2	Do.
16 flathead wood screws.....			No. 10	1	Do.
16 standard screw eyes.....					No. 7 wire, ¼-inch eye.
24 flathead iron rivets.....				2½	Norway iron.
24 flathead iron rivet burrs.....					O. H. steel, No. 1.
1 ounce wire fourpenny casing nails.....					
1 ounce brads.....			1		
Wood parts.					
2 side sills.....	4½	2½		150	White oak.
1 center sill.....	5	2½		150	Do.
1 front sill.....	4½	2½		52	Do.
1 rear sill.....	4½	2½		54	Do.
2 diagonal sills.....	2	2½		36	Do.
2 diagonal sills.....	2	2½		28	Do.
6 cross sills.....	2½	1		48	Do.
2 corner posts.....	4½	4½		21	Do.
22 posts.....	2½	1½		22	Do.
2 upper raves, sides.....	2	2½		150	Do.
2 lower raves, sides.....	2½	1½		150	Do.
2 upper raves, ends.....	2	2½		52	Do.
2 lower raves, ends.....	2½	1½		52	Do.
1 partition cross rail.....	2½	2		52	Do.
2 partition cleats.....	1½	1½		18	Do.
2 seat top pieces.....	5	1		18	Do.
1 seat back.....	9½	1		48	Do.

Correct nomenclature for and list of parts, with dimensions, of artillery store wagon—
Continued.

Parts of wagon.	Bill of material.				Material.
	W.	T.	D.	L.	
BODY—continued.					
Wood parts—Continued.					
	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
2 side pieces for arch over front wheel.	10	1½	.....	32	White oak.
2 side pieces for arch over front wheel.	10	1½	.....	24	Do.
2 cover pieces for arch over front wheel.	12	½	.....	28	Do.
4 cover pieces for arch over front wheel.	8	½	.....	18	Do.
4 seat-box partition cleats.	1½	1	.....	18	Do.
1 seat hasp post.	3½	1½	.....	8	Do.
2 brake levers.	3	2½	.....	36	Do.
2 brake-lever blocks.	3½	3	.....	10	Do.
2 water-barrel brackets.	8	2½	.....	27	Do.
2 spade-attachment blocks.	3	2	.....	12	Do.
2 ax-attachment blocks.	2½	2	.....	6	Do.
1 footboard, bottom.	14	1½	.....	48	Ash.
2 footboards, side.	8	1½	.....	44	Do.
1 footboard, end.	8	1½	.....	20	Do.
4 bottom boards.	10	.....	.....	144	Poplar.
2 side-panel boards.	11	.....	.....	144	Do.
2 side-panel boards.	7	.....	.....	144	Do.
2 end-panel boards.	11	.....	.....	82	Do.
2 end-panel boards.	7	.....	.....	82	Do.
1 seat board.	16	1	.....	42	Do.
2 seat-board end pieces.	3	1	.....	16	Do.
1 cross partition under seat.	14	.....	.....	48	Do.
2 seat-box partition pieces.	15½	.....	.....	14	Do.
1 seat-box partition piece.	6½	.....	.....	8	Do.
1 seat-box piece.	6	.....	.....	16	Do.
2 seat-box partition pieces.	5½	.....	.....	14	Do.
2 seat-box partition pieces.	3	.....	.....	6	Do.
2 seat-box partition pieces.	3½	.....	.....	14	Do.
2 seat-box partition pieces.	2	.....	.....	14	Do.
TOP.					
Metal parts.					
1 hood frame.	.....	.....	.....	280	O. H. steel, No.
4 hood-frame tire bolts.	.....	.....	.....	2	Do.
4 hood-frame tire-bolt washers.	.....	.....	.....	.....	Do.
4 hood-frame bolts (carriage).	.....	.....	.....	14	Do.
1 hood-frame bolt (carriage).	.....	.....	.....	14	Do.
1 hood-frame bolt washer.	.....	.....	.....	.....	Do.
2 boot hooks.	1	½	.....	6	Do.
4 boot-hook flathead wood screws.	.....	.....	No. 10	1	Do.
16 standard screw eyes.	.....	.....	.....	.....	No. 7 wire, ¼-inch iron
200 flathead wood screws.	.....	.....	No. 10	1½	Iron.
65 flathead wood screws.	.....	.....	No. 10	1	Do.
40 flathead wood screws.	.....	.....	No. 12	1½	Do.
80 flathead wood screws.	.....	.....	No. 8	½	Do.
1 ounce tacks, 8-ounce.	.....	.....	.....	.....	.....
Wood parts.					
9 bows.	1½	½	.....	168	Ash.
1 bow.	1½	1	.....	142	Do.
10 bow cleats.	2½	.....	.....	188	Do.
2 bow-cleat filler block pieces.	2½	.....	.....	132	Poplar.
1 bow cleat.	3½	.....	.....	138	Ash.
8 half-round pieces.	.....	.....	.....	60	Hickory.
Cotton duck parts.					
1 cover for top of bows; 9.04 yards cotton duck, 80½ inches, No. 4, dyed.	.....	.....	.....	.....	.....
½ pound black harness leather back, medium.	.....	.....	.....	.....	.....
0.02 pound linen thread, drab, No. 25.	.....	.....	.....	.....	.....
0.016 ounce shoe thread, D. E., No. 3.	.....	.....	.....	.....	.....
0.01 ounce black wax.	.....	.....	.....	.....	.....
2 iron roller buckles, ½-inch, tinned.	.....	.....	.....	.....	.....

Correct nomenclature for and list of parts, with dimensions, of artillery stone wagon—
Continued.

Parts of wagon.	Bill of material.				Material.
	W.	T.	D.	L.	
TOP—continued.					
Cotton duck parts—Continued.					
1 outer cover; 14½ yards cotton duck, 30½ inches, No. 4, dyed:	Inches.	Inches.	Inches.	Inches.	
16 yards cotton duck, 36 inches, No. 4, dyed.					
½ pound black harness leather back, medium.					
0.08 pound linen thread, drab, No. 26.					
0.1875 pound shoe thread, D. B., No. 3.					
0.02 ounce black wax.					
1½ pounds hemp cord, 0.1875-inch.					
30 brass grommets, No. 2.					
2 iron roller buckles, 1-inch, tinned.					
4 tubular rivets and caps, 0.8125-inch, japanned.					
1 front curtain:					
1½ yards cotton duck, 30½ inches, No. 4, dyed.					
1½ yards cotton duck, 36-inch, No. 4, dyed.					
1 yard cotton duck webbing, 1-inch, dyed.					
0.62 pound black harness leather back, medium.					
0.20 ounce linen thread, drab, No. 26.					
0.08 ounce shoe thread, D. B., No. 3.					
0.04 ounce black wax.					
5 iron roller buckles, 0.1875-inch, tinned.					
10 tubular rivets and caps.					
1 boot for footboard:					
4½ yards cotton duck, 30½ inches, No. 4, dyed.					
0.20 pound black harness leather back, medium.					
0.32 ounce linen thread, drab, No. 26.					
0.24 ounce shoe thread, D. B., No. 3.					
0.01 ounce black wax.					
2 brass grommets, No. 2.					
2 tubular rivets and caps, 0.8125-inch, japanned.					
Equipment.					
1 water barrel.			17½ 18½	32½	Oak, ½ staves. Do.
Metal parts—					
1 water-barrel plug cap.			¾	1½	Bronze casting.
1 water-barrel plug-cap nipple.			¾	1½	Do.
1 water-barrel plug nipple jam nut.			¾	.873	Do.
1 water-barrel bib (special).					Do.
1 water-barrel bib nut.					Do.
2 water-barrel handles.					Do.
3 water-barrel handle bolts (special).					O. H. steel, No. :
8 water-barrel handle nuts (special).					Do.
2 water-barrel chains (3 links each).			½	11½	Do.
2 water-barrel chain hooks.			¾	36	Do.
2 water-barrel chain-hook links.			.187	1½	Do.
2 water-barrel chain eye-bolts.			.812	10	Do.
2 water-barrel chain eye-bolt washers.			.812		Do.
2 water-barrel chain eye-bolt nuts.			.812		Square, U. S. standard, hot pressed.

Correct nomenclature for and list of parts, with dimensions, of artillery store wagon—
Continued.

Parts of wagon.	Bill of material.				Material.
	W.	T.	D.	L.	
TOP—continued.					
Equipment—Continued.					
1 coal-oil can:	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
1 coal-oil can body.....	15	No. 24		40	Galvanized iron.
1 coal-oil can handle.....			.187	12	Coppered iron wire.
2 coal-oil can handle eyes.....	2	.109		5	Brass.
6 coal-oil can handle eye rivets, flathead.....			No. 10		Brass (jacket).
1 coal-oil can screw cap.....			1		Zinc.
1 coal-oil can screw-cap nipple.....			1		Do.
12 coal-oil can (body) rivets....					Tinned iron.
1 coal-oil can spout (special)....					Bronze casting.
1 coal-oil can spout cap (special).....					Do.
1 coal-oil can spout-cap chain.....					Brass, No. 00, safety.
1 coal-oil can spout-cap staple and eye.....			.068	8	Brass wire.
3 coal-oil can spout rivets, flat-head.....			No. 10	1	Brass (jacket).
6 ounces solder for coal-oil can.....					
1 wheel-grease can:					
1 wheel-grease can body.....	12½	No. 20		88	Galvanized iron.
20 wheel-grease can rivets, 16-ounce.....					Tinned iron.
1 wheel-grease can handle (wire).....			.187	12	Coppered iron wire.
1 wheel-grease can handle fastening.....	8	No. 24		10½	Galvanized iron.
2 wheel-grease can handle fastening rivets, 2-pound.....					Tinned iron.
1 wheel-grease can screw cap (special).....					Bronze casting.
1 wheel-grease can screw-cap nipple.....					Do.
1 wheel-grease can spatula blade.....	1	.10		11	Spring steel.
1 wheel-grease can spatula handle, 2 pieces.....	1	1		4	Hard maple.
4 wheel-grease can spatula handle rivets.....			1	24	O. H. steel, No. 1.
1 wheel-grease can spatula sheath.....	3	No. 24		10½	Galvanized iron.
5 ounces solder for wheel-grease can.....					
1 machinist's hammer, 12½-inch handle.....					
1 screw wrench, 12-inch.....					
1 lantern.....					Star Head Light Co. solid bottom.
2 shovels, long-handled.....					(Special.)
2 spades, short-handled.....					(Special.)
2 axes, handled.....					(Special.)
2 pickaxes, handled.....					(Special.)
1 artillery driver's whip.....					Lace leather.
1 artillery driver's whip socket.....					Harness leather.

ARTILLERY STORE WAGON—NEW MODEL.

This wagon is a modified form of the artillery store wagon issued to the service in 1901.

The more important changes from the old model are:

The weight has been reduced from 2,325 pounds to 1,810 pounds.

The water barrel has been removed.

The top is the ordinary wagon type, with bows and a cover which is reversible. The bows and cover can be readily removed.

The tool box, which was formerly under the driver's seat, has been placed under the bed in rear of the hind axle. The wagon has no driver's seat and will be drawn by six horses, using the regular artillery harness with drivers in the saddles. The removal of the seat and tool box increases the capacity of the wagon.

The front gear has been changed to permit the front wheels, which are smaller, to turn under the bed. This does away with the cut under, thereby increasing the capacity of the bed and simplifying its construction.

The brake may be operated from either side of the wagon by changing the brake stake and brake quadrant from one side to the other. These parts are reversible, fitted for either side and readily changed. The brake may thus be operated either by the wheel driver, by a man on the off-wheel horse, or by a man on foot at the side of the wagon.

These changes have been based on the recommendations contained in the reports of the battery commanders who have used the old wagons. The object of the old wagon was to carry only the knapsacks, but from the above reports the wagon would undoubtedly be of greater use as a means of carrying any of the implements of the battery which could not be accommodated on the other vehicles. For this reason the wagon was designed as a general-utility wagon for such varied use as the battery commander might deem advisable.

The capacity of the wagon with top is 196 cubic feet.

The wagon is designed to carry a load of 4,500 pounds on good roads, but on rough roads the load should not exceed 3,500 pounds.

The wagon is fitted with the new model pole with a pole prop.

The following tools and accessories are furnished with each wagon and placed in compartments in the tool box, viz:

- 1 wheel grease can.
- 1 wheel grease-can knife.
- 1 coal oil can.
- 1 hand hammer, 12½-inch handle.
- 1 railroad lantern.
- 1 screw wrench, 12-inch.
- 1 iron nut wrench.

Three models of ammunition chests for 3.2-inch field gun limbers and caissons are in use in the service. The first two differ only in height, the second model being 3½ inches higher than the first. In the third and latest model, to which pattern all old model chests are changed when turned in, the increased height is retained, and the interior arrangement changed so that a portion of the projectiles are packed in the center compartment; the latter arrangement shifting the weight in chest so as to reduce the pull on the necks of the wheel team to a minimum of about 6 pounds.

SPARE PARTS FOR CARRIAGE.

The following spare parts for 3.2-inch field gun carriage are issued to the service and carried on the body of forge and battery wagon or in artillery store wagon:

(Six months' supply. Expendable parts marked *.)

	Price each.
1 crosshead elevating nut	\$3.00
1 pair bow-spring brakes (per pair)	57.00
2 singletrees	2.57
1 doubletree	7.06
1 neck yoke	7.63
4 pole pads*	1.25
6 linchpins*	1.21
8 linchpin washers* .....	.60
8 ammunition chest bolts and nuts* .....	.45
4 turn-buckles for ammunition chests*	3.00
4 breech strap eye washers*	1.15
2 nuts for assembling bolts for lary tongs*	2.23
4 shoes for caisson brakes*	1.75
4 lid props*	2.95
4 lid-prop plate pivots* .....	.25
2 pintle keys and chains*	3.30
1 spare pole*	11.00

In addition to the above, the following parts of 3.2-inch field gun carriage are issued upon requisition for repairs:

	Price each.
Axle, steel.....	\$28.00
Axle-seat standards.....	3.50
Axle-seat guard-rail hinge pins.....	.24
Axle-seat guard-rail hinge-pin washers.....	.20
Wheels, complete.....	26.00
Nave box, complete.....	6.50
Nave-box flange bolt.....	.20
Nave-box flange-bolt nuts.....	
Nave-box assembling nut.....	.40
Nave-box assembling-nut lock screw.....	1.60
Linchpin clasps.....	
Cap squares.....	13.30
Cap square eyebolt.....	
Cap square eyebolt chains.....	.57
Cap square eyebolt keys.....	2.44
Cap square eyebolt studs.....	
Cap square eyebolt rings.....	
Breech-strap eye washers.....	1.15
Bow-spring brake, pair, complete.....	67.00
Parts of bow-spring brake:	
Clevis.....	4.80
Clevis bolt.....	.85
Clevis-bolt nuts.....	
Attachment socket.....	6.50
Locking levers.....	11.33
Locking-lever seat-rail stud.....	.60
Locking-lever bolt.....	2.50
Locking-lever bolt nut.....	
Bow springs.....	6.50
Bow-spring bolt.....	.38
Bow-spring bolt nut.....	
Brake shoe.....	4.80
Trail-box lid.....	3.50
Trail-box hinge plate.....	
Trail-box hinge pieces.....	
Trail-box hinge pin.....	
Trail-box hasp.....	
Trail-box hasp strap.....	
Trail-box turn-buckle.....	
Trail-box turn-buckle stud.....	
Trail handspike, complete.....	38.55
Parts of trail handspike—	
Socket.....	
Trail-handspike spline.....	
Lower band.....	
Middle band.....	
Upper band.....	
Rivets.....	
Washers.....	
Spring-handspike clasp.....	1.40
Elevating device (double screw) complete.....	85.76
Parts of elevating device (double screw)—	
Fork body.....	
Fork front-hinge piece.....	
Fork rear-hinge piece.....	
Fork front-pivot transom bolt.....	
Fork front-pivot transom bolt lock nut.....	
Fork front-pivot transom bolt separator.....	
Fork front hinge-piece journal thimbles.....	
Fork rear-pivot bolt.....	
Fork rear-pivot bolt nut.....	
Breech-strap eye washer.....	1.15
Inner elevating screw.....	
Outer elevating screw.....	
Horizontal gear.....	
Horizontal-gear semicircular keys.....	
Horizontal-gear semicircular key screws.....	
Horizontal-gear feather key.....	.62
Horizontal-gear feather key screw.....	.14
Cromhead.....	5.11
Cromhead bearing (right).....	6.35
Cromhead split bearing (left).....	
Cromhead-bearing split journal box.....	
Cromhead-bearing bolts.....	
Cromhead-bearing nuts.....	
Vertical gear.....	
Crank spindle.....	
Crank.....	
Crank handle.....	2.12
Crank-handle pin.....	
Crank key.....	

	Price each.
Elevating device (lazy tongs) complete.....	\$47.00
Parts of elevating device (lazy tongs)—	
Side levers.....	
Side-lever eyebolts.....	
Side-lever eyebolt nuts (hexagonal).....	
Side-lever journal rod.....	
Short arms.....	
Levers.....	
Long arms.....	
Lower journal rod.....	
Assembling bolt, long.....	
Assembling bolt, short.....	
Central journal bolt.....	
Upper assembling bolt.....	
Breech-strap eye washers.....	
Assembling-bolt washers.....	
Assembling-bolt nuts, hexagonal.....	3.60
Crosshead elevating nut.....	8.22
Crosshead elevating-nut slides.....	.31
Elevating screw.....	.79
Elevating-screw washer.....	.13
Elevating-screw nut.....	
Elevating-screw nut pin.....	
Lower-journal brackets.....	
Lower-journal caps.....	
Lower-journal cap screws.....	
Assembling bolts (lower journal box to flasks).....	
Assembling-bolt nuts.....	
Lower bracket.....	
Lower-bracket screw bolts.....	
Upper bracket.....	
Upper-bracket bolts.....	
Upper-bracket bolt nuts.....	
Transom bolt.....	.75
Transom-bolt nuts.....	.25
Washer plate.....	
Washer-plate rivets.....	
Crank handle.....	2.12
Crank-handle pin.....	
Crank key.....	

Parts of ammunition chest (see ammunition chest for limber, page 501).

If carriage is damaged to such an extent as to not readily admit of repair by the application of the parts provided for issue authority should be obtained to turn same in to Rock Island Arsenal.

Two models of carriages of this class have been constructed, the earlier model having the lazy-tong elevating device, the latter the double-screw device; also differing in minor details of fittings and attachments.

In making requisition for spare parts the model and number of carriage for which parts are required must be given in requisition.

Bow-spring brakes, breech straps, and trail handspikes are considered parts of the complete carriage, and always issued with it.

SPARE PARTS FOR LIMBER.

The following parts for limber of 3.2-inch field gun caisson and forge and battery wagon are issued to service upon requisition when needed, but none are carried with the battery:

	Price each.
Axles.....	
Wheels, complete:.....	\$24.00
Nave boxes.....	
Nave-box flange bolts.....	
Linch pins.....	
Linch-pin clasps.....	
Linch washers.....	

For
prices,
see
page 502.

	Price each.
Foot boards, complete:	
Footboard, front	
Footboard, rear	
Footboard latch	
Footboard latch strap	
Footboard latch-hinge pin	
Footboard latch-strap screws	
Footboard strap hinges without holes	
Footboard compartment	
Pintle keys and chains, complete	\$3.50
Pintle key chains	
Pintle key chain ring	
Pintle key chain eye plate	
Primer-box lids	1.40
Primer-box lid chain .....	.22
Primer-box screw bolts .....	.30
Primer-box safety latches, right and left	3.00
Ammunition-chest bolts and nuts, complete .....	.45
Pole props, complete:	
Pole-prop body	5.40
Pole-prop body spring	
Pole-prop hinge piece	
Pole-prop key rivet	
Pole-prop key chain .....	.35
Pole-prop key .....	.36
Pole-prop key bolt .....	.70
Pole-prop key bolt nut	
Pole-prop eye rivet	1.96
Pole-prop hook .....	.06
Pole-prop hook chain	
Pole-prop chain staple	
Pole-prop carriers	4.52
Ammunition chest, complete (same for chest on carriages)	85.75
Parts for ammunition chest—	
Handles	3.50
Corner plates, end and sides	
Corner plates, end and bottom	
Corrugated safe plate	
Front stay	
Backstay	
Hinges	
Hinge pins	
Hinge-strap covers	
Hasp	
Hasp strap	
Hasp hinge pin	
Hasp-strap covering	
Guard rail securing plates	
Turn-buckle, complete	
Turn-buckle pivot and plate	
Turn-buckle safe plate	
Turn-buckle pivot-plate rivets	
Turn-buckle washer	
Paulin-strap plates	
Paulin-strap buckles	
Lid props, right or left, complete	
Parts for lid props—	
Lid-prop straps	
Lid-prop strap hinge pins	
Lid-prop brackets	
Lid-prop bracket pivots	
Lid-prop bracket rivets	
Lid-prop plates	
Lid-prop plate pivots	
Lid-prop plate rivets	
Thimbles for supporting lid prop	
Covers for rivet heads	
Transom rods	
Staples	
Long middle partitions, aluminum } for latest model chests only	
Short middle partitions, aluminum }	
Short side partitions, aluminum	
Long side partitions, aluminum	
Circular partitions, aluminum (for latest model chest only)	
Long partitions, bronze	
Medium partitions, bronze	
Short partitions, bronze	
Partition studs, bronze	
Supporting brackets, short, bronze	
Supporting brackets, long, bronze	
Ammunition-chest bolts and nuts .....	.45
Padlocks and key .....	.60
Padlock chains	
Canvas covers for ammunition chest .....	.87

	Price each.
Wooden parts of projectile packing:	
Packing division pieces.....	\$0.10
Half-packing division pieces.....	
Packing cleats.....	
Packing-cleat brackets.....	5.07
Side rails, right.....	5.07
Side rails, left.....	1.75
Side rail under straps.....	1.10
Side-rail brace rods.....	7.05
Doubletree, complete.....	
Parts for doubletree—	
Doubletree body.....	
Doubletree top plate.....	
Doubletree bottom plate.....	
Doubletree end and stay hooks.....	
Doubletree bolt bushing.....	
Doubletree separators.....	
Doubletree rivets.....	
Doubletree stay chains.....	2.57
Singletree, complete.....	
Parts for singletree—	
Singletree bodies.....	
Singletree center eyes.....	
Singletree trace hooks.....	
Singletree rivets.....	7.65
Neck yokes, complete.....	
Parts for neck yokes—	
Pole ring.....	
Neck-yoke center eye sleeve.....	
Neck-yoke eye bands.....	
Neck-yoke eye rings.....	
Pole-strap eye loops.....	
Pole-strap eye-loop rollers.....	
Martingale staples.....	
Neck-yoke center eye sleeve rivets.....	
Neck-yoke eye-band rivets.....	
Neck-yoke body (wood).....	11.00
Pole.....	
Neck-yoke stop with hinge eye.....	
Pole ferrule.....	2.50
Pole bolts.....	.25
Pole covers, copper.....	
Pole-pad ring.....	1.25
Pole pad.....	6.50
Canvas cushions.....	

If limber is damaged to such an extent as to not readily admit of repairs by the application of the parts provided for issue, authority should be obtained to turn same in to Rock Island Arsenal.

The wheels of limber, though of similar design to those used on carriage, are of a lighter weight, and are used only for limber, caisson, and forge and battery wagon.

SPARE PARTS FOR CAISSON.

The following parts of caisson are issued to the service for use in repairs when needed, to wit:

	Price each.
Axles, steel.....	\$38.00
Caisson wheel.....	26.00
Nave boxes.....	
Nave-box flange bolts.....	
Linchpins.....	1.21
Linch washers.....	.69
Linchpin clasp.....	
Spare pole attachments complete.....	4.75
Parts of spare pole attachments—	
Spare pole stirrup.....	.85
Spare pole-attachment seat and strap.....	
Spare pole-attachment key bolt.....	3.28
Spare pole-attachment key-bolt chain.....	.25
Spare pole-attachment key-bolt swivel stud.....	.31
Pickaxe attachments complete (side rail).....	.55
Pickaxe attachments complete (middle rail).....	.56
Pickaxe handle strap.....	
Pickaxe catch spring.....	1.23

	Price each.
Shovel attachments	
Shovel-handle spring catches	
Maneuvering handspike attachments complete:	
Handspike-attachment screws	
Handspike-attachment seat	
Handspike-attachment bolt	
Handspike-attachment bolt-pivot pin	\$0.20
Handspike-attachment bolt key	
Handspike-attachment swing-bolt key rivet	
Handspike-attachment seat rivets	
Axe and spade boards	
Axe and spade board irons	1.00
Floor rods	
Floor-rod nuts	
Lever road brakes (2) complete	94.97
Parts for lever road brakes—	
Brake arms	
Brake-arm hinge pin	
Brake shoes	1.50
Brake-shoe screw bolts .....	.20
Hanger straps	
Hanger-strap screw bolts .....	.26
Hanger-strap screw-bolt nuts	
Brake rods complete	1.00
Arm attachments	
Arm attachment bolts	
Springs	
Spring assembling bolts	
Spring assembling bolt nuts	
Attachment rods	
Attachment-rod bolts	
Attachment-rod bolt nuts	
Brake frames complete	5.92
Frames, right and left	
Ratchet pieces, right and left	
Ratchet-piece rivets	
Lever retaining springs	1.75
Lever stops	
Lever-stop rivets	
Assembling bolts	
Assembling bolt nuts	
Levers, right and left	2.00
Brake-lever pivot bolts .....	.85
Brake-lever pivot-bolt nuts .....	.16
Footboards complete	
Parts of footboard. (See Parts of footboard of limber, page 501.)	
Ammunition chest and parts. (See limber, page 501.)	
Side rails, right	4.78
Side rails, left	4.78
Side rail under straps	1.75
Side-rail brace rods	1.10
Spare-wheel axle complete	
Parts of spare-wheel axle—	
Spare-wheel axle bolster	
Spare-wheel axle body	
Spare-wheel axle ribs	
Spare-wheel axle-rib rivets	
Spare-wheel axle washer	
Spare-wheel toggle	
Spare-wheel toggle link	
Spare-wheel axle bolt	
Spare-wheel axle bolt nut	
Front spare-wheel bolster nut	
Rear spare-wheel bolster nut	
Rear spare-wheel bolster washer	
Rear spare-wheel bolster-bolt nut	
Lunette props .....	.70
Lunette-prop attachment	
Canvas cushions	5.50

If caisson is damaged to such an extent as to not readily admit of repairs by the application of the parts provided for issue, authority should be obtained to turn same in to Rock Island Arsenal.

SPARE PARTS FOR FORGE AND BATTERY WAGON.

The following parts of forge and battery wagon are issued for repairs when required:

	Price each.
Forge chest	\$75.50
Spring steel packing for holding smith's tools in place	
Bronze lugs	26.00
Wheels complete	
Nave boxes (also other parts of nave box, see Limber, page 500)	
Nave box flange bolts (also other parts of nave box, see Limber, page 500)	7.05
Doubletrees (also other parts of these, see page 502)	2.57
Singletrees (also other parts of these, see page 502)	7.65
Neck yokes (also other parts of these, see page 502)	1.21
Linchpins .....	.69
Linch washers	
Linchpin clasps	7.53
Pole props	
Parts of pole prop. (See Limber, page 501.)	
Battery wagon body, wood (chest)	102.00
Anvil attachment complete	
Front crossbar anvil blocking	
Anvil key bolt	
Anvil key nut	
Anvil key chain	
Anvil key chain eye rivet .....	.70
Lunette props	
Lunette-prop attachment, complete (rear)	
Lunette-prop attachment, complete (front)	
Lunette-prop attachment turn-buckle	
Lunette-prop attachment turn-buckle stud	
Lunette-prop attachment hinge pins	
Lunette-prop attachment screws	
Sledge attachment complete	
Sledge-attachment turn-buckle	
Sledge-attachment turn-buckle stud	
Sledge-attachment hinge pins	
Sledge-attachment screws	
Saddler's tool chest	22.00
Parts of saddler's tool chest—	
Lid band	
Corner pieces	
Chest hinges	
Chest handles	
Lid stay chains	
Metal packing in chest	
Carpenter's tool chest	29.45
Parts of carpenter's tool chest—	
Lid band	
Corner pieces	
Chest hinges	
Chest handles	
Chisel clamp, complete	
Arm	
Turn-buckle	
Turn-buckle pivot and plate	
Hinge bracket	
Hinge pin	
Lid props, complete	
Straps	
Brackets	
Bracket pivot pin	
Strap hinge pin	
Pivot stud	
Pivot-stud washer	
Packing for holding tools in chest	
Road brakes and parts thereof (these are the same as those for caisson. See page 503)	
Parts for grindstone frame:	
Frame legs	
Frame-leg feet	
Frame sides	
Frame corner pieces	
Journal boxes	
Journal-box caps	
Journal-box cap screws	
Journal-box set screws	
Crank shaft	
Crank arm	
Crank-handle pin	
Grindstone bushing with fixed flange	
Grindstone bushing with fixed flange key	
Grindstone-bushing key chain	

	Price each.
Parts for grindstone frame—Continued.	
Grindstone-bushing key-chain ring	
Grindstone-bushing key-chain stud	
Grindstone-bushing stay pin	
Grindstone loose flange	
Crank key	
Spanner wrench for flange	
Crank handle (wood)	

If the metallic body of the forge or battery wagon is seriously damaged, authority should be obtained to turn same in to Rock Island Arsenal.

SPARE PARTS FOR ARTILLERY STORE WAGON.

Such parts of the artillery store wagon as may be needed for minor repairs will be issued as required. In making requisition for such parts nomenclature given in the list on pages 488-497 should be followed.

EQUIPMENT OF 3.2-INCH FIELD BATTERY.

The following tools and equipment are issued to and carried with each battery of 3.2-inch field guns, and in the places named:

	Price each.
<i>On each gun.</i>	
1 breech cover	\$2.14
1 tompon and muzzle cover .....	.96
<i>On each carriage.</i>	
[* Expendable.]	
1 sponge and rammer, bore, complete	6.00
2 sponges and rammers, chamber, complete	8.58
1 sponge cover, bore .....	.18
2 sponge covers, chamber .....	.14
1 prolonge (section of picket rope)	9.35
<i>In trail box:</i>	
1 combination screw-driver	1.58
1 gunner's gimlet	1.30
1 gunner's reamer	1.20
1 priming wire* .....	.62
2 primer pouches	1.59
2 lanyards* .....	.81
1 fuse punch	3.40
1 vent punch .....	.50
1 obturator-nut wrench	1.84
1 breech strap (part of carriage) .....	.98
<i>On carriage limber</i>	
<i>Left-hand compartment under footboards:</i>	
1 front sight (for price see page 324)	
1 breech (rear) sight, bronze (for price see page 324)	
1 breech (rear) sight pouch	2.54
<i>In left-hand footboard compartment:</i>	
1 front-sight cover .....	.87
<i>In ammunition chest:</i>	
2 gunner's haversacks	3.50
<i>Right-hand compartment under footboards:</i>	
1 sperm oiler, rectangular, brass .....	.50
1 axle grease can	2.15
1 grease knife .....	.70
<i>Left-hand compartment under footboards:</i>	
2 watering buckets, canvas	1.49
<i>In right-hand compartment under footboards:</i>	
1 screw wrench, 12 inches .....	.55
1 iron nut wrench, 12 inches long .....	.50
1 cold chisel, $\frac{1}{2}$ inch by 8 inches long .....	.22
1 file, 8 inches, hand bastard .....	.10
1 hammer, hand, 12 $\frac{1}{2}$ -inch handle .....	.90
1 punch, small, steel .....	.16
1 tool box	1.64
2 paulins, 12 by 12 feet	8.58
1 cushion	6.50

	Price each
On each caisson body.	
1 maneuvering handspike.....	\$0.96
2 shovels, long-handled.....	.65
2 spades, short-handled.....	.65
2 pickaxes, handled.....	.54
2 axes, handled.....	.75
2 lanterns, railroad.....	.60
1 prolonge (section of picket rope).....	9.35
1 spare pole.....	11.00
1 spare wheel.....	22.00
2 paulins, 12 by 12 feet.....	8.50
2 cushions.....	6.50
On each caisson timber.	
1 axle-grease can.....	See prices above.
1 grease knife.....	
2 paulins, 12 by 12 feet.....	
2 watering buckets, canvas.....	
1 cushion.....	
FORGE AND BATTERY WAGON.	
On battery wagon.	
Inside of wagon body:	
2 water buckets, galvanized iron.....	1.65
1 prolonge (section of picket rope).....	9.35
2 lanterns, railroad.....	.60
1 oil can, sperm, 24 pints.....	.46
1 oil can, coal, 3 gallons.....	3.27
1 grindstone complete.....	14.65
2 jackscrews.....	4.50
1 hammer, sledge.....	1.50
1 anvil, 100 pounds.....	6.00
1 vise, forge.....	5.75
On forge.	
2 paulins, 12 by 12 feet.....	8.50
In footboard compartment:	
2 watering buckets.....	1.65
1 axle-grease can.....	2.15
1 grease knife.....	.70
1 canvas coal bag, 3 bushels.....	2.25
Issued by Quartermaster's Department:	
200 pounds horseshoes.....	
60 pounds horseshoe nails.....	
In forge chest:	
1 forge, portable.....	25.00
1 wrench for forge (issued as part of forge).....	.47
2 aprons, leather, smith's.....	.70
1 die stock—	
Tape 1/4.....	
Tape 1/2.....	
Tape 3/4.....	
Tape 1.....	
Tape 1 1/4.....	
Tape 1 1/2.....	
Tape 1 3/4.....	
Tape 2.....	
Dies 1/4.....	
Dies 1/2.....	
Dies 3/4.....	
Dies 1.....	
Dies 1 1/4.....	
Dies 1 1/2.....	
Dies 1 3/4.....	
Dies 2.....	
1 hammer, hand.....	.80
1 hammer, riveting.....	.75
1 hammer, shoeing.....	.86
1 pair tongs for holding 1/4-inch iron.....	.72
1 pair tongs for holding 1/2-inch iron.....	.72
1 pair tongs, smith's, 11-inch.....	.80
1 chisel for cutting hot iron.....	.50
1 chisel for cutting cold iron.....	.50
1 cold chisel, hand, 1-inch.....	.25
1 fore punch and creaser.....	1.50
1 pritchel.....	.19
1 shoeing rasp, 16-inch.....	.45
1 file, flat bastard, 12-inch.....	.14
1 punch, round, hand.....	.19
1 hardie.....	.19
1 screw wrench, 12-inch.....	.84
2 knives, shoeing.....	.30
1 knife, toe.....	.42
1 shoeing pincers.....	1.90

	Price each.
FORGE AND BATTERY WAGON—continued.	
<i>On forge—Continued.</i>	
In forge chest—Continued.	
1 clinching iron	\$0.30
1 punch, nail .....	.06
1 rule, 2-foot, 4 fold .....	.18
1 square, steel .....	.48
1 oiler .....	.18
1 shoeing box, leather	1.81
1 file handle, iron, 6-inch .....	.86
1 fire rake .....	.14
1 fire shovel .....	.25
2 small canvas bags (for nails and small stores) .....	.60
SET OF SADDLER'S TOOLS.	
In saddler's tool chest, part of forge and battery wagon, in chest compartment:	
12 awls, stitching, assorted	
6 awl handles, plain (for stitching awls)	
1 awl handle, patent (for stitching awls)	
1 awl seat, handled	
1 awl, stub (2 inches long, with handle not patent)	
1 awl, peg (with patent handle)	
1 edge tool No. 2	
1 edge tool No. 1	
1 claw tool	
1 pair compasses, common, 6-inch	
2 crescent, wood	
1 gauge, draw	
1 hammer, riveting	
1 hammer, saddler's	
1 knife, half round, 5-inch	
1 head knife	
2 knives, shoe	
1 knife, splitting, 6-inch	
1 mallet head, 14 to 16 inches	
6 papers needles, harness, Nos. 4, 5, and 6	
1 paper needles, glover's, No. 3	
1 pair nippers, cutting	
1 oil stone	
1 pliers, 6-inch	
1 pricking carriage, 3 wheels, 7, 8, and 10	
1 revolving punch, 4 tubes, 4, 5, 6, and 7	
3 punches, hand, 7, 8, and 10	
1 punching block, lead	
1 rule, 2-foot, 4 fold	
1 rivet set, with 2 holes	
1 riveting iron	
1 sandstone	
1 slicker, steel, with wooden handle	
1 screw-driver, 3-inch	
1 tickler	
2 thimbles	
1 stitching clamp (not carried in tool chest)	
1 stitching horse, complete	
1 driving punch, No. 5	
1 sewing palm	
1 pair shears, 6-inch blade	
2 small canvas bags for small stores	
SET OF CARPENTER'S AND WHEELWRIGHT'S TOOLS.	
In carpenter's tool chest, part of forge and battery wagon, in chest compartment:	
1 brace	1.85
12 bits for brace, assorted .....	.60
1 drawing knife, 12-inch .....	.86
1 hand saw, 20-inch	1.20
1 rip saw, 26-inch	1.02
1 hand ax, No. 7 .....	.60
1 hammer, claw	
4 chisels, framing—	
1-inch .....	.30
1-inch .....	.36
1½-inch .....	.42
2-inch .....	.54
3 gouges, framing—	
1-inch .....	.30
1-inch .....	.60
1½-inch .....	.72
1 screw wrench, 12-inch .....	.54
1 plane, jack .....	.50
1 plane, smoothing .....	.48
1 spokeshave .....	.22
1 rule, 2-foot, 4 fold .....	.18

For
prices
see
page 630.

	Price each.
SET OF CARPENTER'S AND WHEELWRIGHT'S TOOLS—continued.	
In carpenter's tool chest, part of forge and battery wagon, in chest compartment—Cont'd.	\$0.48
10 brad awls, assorted, with (and contained in) handle	.24
1 square, trying, 9-inch	.10
1 awl, scribing	
12 files, saw, assorted—	.035
4-inch	.055
6-inch	.21
1 rasp, wood, 10-inch	.14
1 file, wood, 10-inch	.18
1 chisel, brass	.60
1 collstone, 8-inch	.07
1 gauge	.30
1 compass, 10-inch	.90
1 table vise	.15
1 pincers, small	.48
1 mallet	
6 auger bits—	.10
1-inch	.13
1-inch	.15
1-inch	.24
1-inch	.30
1-inch	.40
2 screw-driver bits—	.06
1-inch	.07
1-inch	.22
1 auger handle, patent	
3 file handles, iron—	.24
4-inch, flat	.24
4-inch, round	.30
6-inch	
1 linen tape line, 100 feet	2.70
2 small canvas bags for small stores	.60

TOOLS AND IMPLEMENTS.

[* Expendable.]

In body of battery wagon:	
8 gunner's gimlets	1.30
8 vent punches	.50
8 priming wires*	.52
4 fuse punches	3.80
30 fuse punch pins*	.15
4 whips, artillery	2.50
4 pickax handles*	.15
8 ax helves*	.12
2 sponges and rammers, complete, chamber	8.50
2 sponges and rammers, complete, bore	6.00
2 sponge heads and sponges, chamber* (head, .14; sponge, .67)	.51
8 sponges, chamber*	.67
1 rammer head, chamber*	.25
2 sponge heads and sponges, bore* (head, .41; sponge, .62)	1.03
4 sponges, bore*	.62
1 rammer head, bore*	.41

SPARE PARTS OF HARNESS.

[* Expendable.]

In body of battery wagon:	
6 breast straps	1.25
6 bridles and bits, artillery:	
3 near horse	4.37
3 off horse	5.12
6 bridles, watering (black leather)	1.18
4 collars, steel	9.00
8 cinchas, artillery—	
4 wheel	1.54
4 lead	1.22
6 halter headstalls	1.65
75 halter straps*	.42
6 martingales with cincha straps	2.47
4 neck-yoke pads*	.36
10 surcingles, Nos. 1, 2, and 3, as called for	.68
4 traces, lead	4.47
4 traces, wheel	3.74
4 mogul springs, 320 pounds	4.00
4 nosebags	1.10
6 side straps to breechings	.555
9 stirrup straps	.51

a Price of sponge and rammer stave bore, \$4.90; sponge and rammer stave chamber, \$0.76.

Sets of three (pulley) blocks, wood, single, double, and treble, and such cord, in pieces of 100 feet each, are issued upon approved requisitions to batteries of field artillery. (O. O. F. 2466, Sept. 25, 1891.)

Fuze wrenches are no longer issued as part of the equipment, as all ammunition is issued filled and fuzeed.

	Price each.
SPARE PARTS, STEEL COLLAR.	
[All expendable.]	
In body of battery wagon:	
2 trace plates.....	\$0.60
4 draft springs.....	.80
6 pad hooks.....	.18
6 pad bolts and nuts.....	.01
4 nuts for pad bolts.....	.01
2 buckle latches.....	.07
6 buckle springs.....	.01
6 bolts and nuts for top connection.....	.04
6 nuts for top-connection bolts.....	.01
6 bolts and nuts for bottom of collar.....	.04
6 nuts for bottom bolts.....	.01
8 bolts and nuts for extension.....	.04
6 nuts for extension bolts.....	.01
6 bolts and nuts for trace plates.....	.04
6 nuts for trace-plate bolts.....	.01
12 back straps with hooks.....	.70
6 back-strap hooks.....	.15
8 back-strap connections.....	.80
6 collar pads, canvas.....	1.52
SUPPLIES.	
[All expendable.]	
On body of battery wagon:	
2 sides bridle leather (24 pounds):	
Black.....	4.68
Fair.....	5.18
2 sides harness leather (40 pounds):	
Black..... per pound.....	.47
Fair..... do.....	.625
2 sides rawhide, soft, for cincha straps.....	1.86
2 pound beeswax.....	.86
3 pounds black wax.....	.10
6 buckles, iron roller, 1-inch.....	.01
6 buckles, iron roller, 1-inch.....	.01
20 buckles, iron roller, 1-inch.....	.01
6 buckles, iron roller, 1-inch.....	.01
4 buckles, iron roller, 1 1/4-inch.....	.02
6 buckles, iron roller, 1 1/4-inch.....	.02
1 paper tacks, copper, 12-ounce.....	.35
1 paper tacks, copper, 20-ounce.....	.35
1 paper tacks, iron, 8-ounce.....	.11
1 paper tacks, iron, 12-ounce.....	.11
1 paper tacks, iron, 18-ounce.....	.11
1 pound rivets and burrs, brass, 1-inch, No. 10.....	.17
1 pound rivets and burrs, brass, 1-inch, No. 10.....	.17
1 pound rivets and burrs, brass, 1-inch, No. 8.....	.17
1 pound of shoe thread, No. 3.....	.90
8 pounds of shoe thread, No. 10.....	.90
8 pounds of shoe thread, No. 10, half bleached.....	.90
1 pound of linen carpet, No. 18.....	.97
10 pounds of nails:	
8 pounds 8-penny.....	.02
5 pounds 10-penny.....	.02
2 pieces of sash cord.....	.81
2 pieces hemp cord, 1/2-inch diameter (for fastening cover on store wagon)..... per pound.....	.116
On body of battery wagon—Continued.	
1 gross wood screws, iron, 1-inch, No. 8.....	.48
8 thimbles.....	.04
8 gallons coal oil.....	.12
50 pounds axle grease.....	.04
1 paper needles, harness, No. 5.....	.0625
1 paper needles, harness, No. 6.....	.0625
2 needles, collar (1 No. 4 and 1 No. 4).....	.11
2 burners for railroad lantern.....	.11
5 wicks for railroad lantern..... per dozen.....	.06
20 washers, leather, for wheel.....	.065
85 pounds bar iron, assorted (issued by Quartermaster's Department).....	
40 pounds toe steel (issued by Quartermaster's Department).....	
250 pounds coal, bituminous (issued by Quartermaster's Department).....	
CLEANING MATERIALS.	
On body of battery wagon:	
4 gallons neatfoot oil.....	.60
2 1/2 pints sperm oil.....	.12
20 pounds harness soap.....	.14
10 pounds castile soap.....	.062
10 pounds sponges.....	1.60
1 quire sandpaper, No. 21.....	.12
1 quire sandpaper, No. 11.....	.12
1 quire sandpaper, No. 4.....	.12

	Price each.
CLEANING MATERIALS—continued.	
On body of battery wagon—Continued.	
1 quire sandpaper No. 00	\$0.12
2 quires emery cloth, No. 90	.42
2 quires emery cloth, No. 120	.42
2 quires emery cloth, No. 00	.42
2 pounds rotten stone	.04
26 papers tripoli	.06
6 quarts cosmic	.11
6 pounds Putz pomade	.25
12 quarts harness oil	.26
1 cleaning box (infantry) containing—	
40 ounces scouring material	
16 ounces leather polish	
40 ounces whiting	
1 pint linseed oil	
2 quarts cosmic, No. 80, soft	
2 chamols skins	
1 wire scratch brush	
2 button sticks	
1 cleaning plate, sheet iron	
1 box for materials	
3 pounds sal soda	
ON ARTILLERY STORE WAGON.	
2 shovels, long-handled	.60
2 spades, short-handled	.60
2 pickaxes, handled	.64
2 axes, handled	.78
1 neck yoke	7.06
1 doubletree	2.57
2 singletrees	.70
1 grease knife	2.15
1 axle-grease can	.60
1 lantern, railroad	2.85
1 coal-oil can, 3 gallons	.90
1 hammer, hand, 12½-inch handle	.65
1 screw wrench, 12-inch	2.29
1 iron nut wrench, 10-inch	1.26
1 wrench for nave box for 3.2-inch carriage	.22
1 cold chisel	
MISCELLANEOUS SUPPLIES.	
1 fuse C, base percussion, sectional	} For prices see p. 350
1 fuse F, base percussion, sectional, model 1902, on board	
1 fuse, 15-second, sectional	3.63
2 marking outfits, complete	16.00
3 gunner's quadrants	19.46
2 range finders (Weldon)	1.12
2 seal stamps	
1 empty shrapnel for instruction, 12½ pounds, sectional	160.00
3 sights, telescopic	1.51
2 stenell outfits	6.78
2 time-interval recorders	

Six months' allowance of saddler's materials, materials for cleaning and preservation, paints, etc., for one six-gun battery of light artillery.

[All articles under this heading expendable.]

	Price each.
4 quires sandpaper (1 No. 2½, 1 No. 1½, 1 No. ½, 1 No. 00)	\$0.12
5 quires crocus cloth	.34
6 quires emery cloth (2 No. 90, 2 No. 120, 2 No. 00)	.42
12 pounds Putz pomade	.25
2 pounds rotten stone	.04
40 papers tripoli	.06
40 pounds harness soap	.14
50 pounds castile soap	.082
10 quarts crown soap	
5 pounds borax	
12 quarts cosmic, No. 80, soft	.11
6 gallons harness oil	1.04
30 pounds cotton waste	.06
16 pounds sponges	1.80
20 gallons neatfoot oil	.60
5 gallons sperm oil	.12
2 boxes ingredients for leather blacking	

Six months' allowance of saddler's materials, materials for cleaning and preservation, paints, etc., for one six-gun battery of light artillery—Continued.

	Price each.
50 pounds axle grease	\$0.04
1 pint linseed oil, raw .....	.60
3 gallons stovepipe enamel	
2 boxes cleaning material, containing—	
40 ounces scouring material	
16 ounces leather polish	
40 ounces whiting	
3 pounds sal soda	
2 chamols skins	
1 wire scratch brush	
2 button brushes	
2 button sticks	
1 cleaning plate, sheet iron	
1 pint linseed oil	
2 quarts cosmetic, No. 80, soft	
1 box for material	
Lebrick's leather oil (issued in place of harness oil in whole or part as desired, same allowance)	2.60
PAINTS, ETC.	
25 pounds paint, lead colored .....	.11
25 pounds paint, black (quick drying) .....	.22
75 pounds paint, olive (quick drying) .....	.18
3 pounds paint, first coat, for 3.2-inch rifle .....	.12
3 pounds paint, second coat, for 3.2-inch rifle .....	.14
4 gallons linseed oil, boiled .....	.60
3 gallons spirits of turpentine .....	.46
4 pieces of sash cord .....	.81
2 pounds hemp cord, $\frac{1}{4}$ -inch diameter (for fastening cover on store wagon) ... per pound ..	.115
6 brushes, paint:	
2 No. 3 .....	.50
2 No. 4 .....	.50
2 No. 5 .....	.50
6 sash tools:	
3 No. 2 .....	.02
3 No. 3 .....	.02
2 pounds paint, black, for steel horse collars .....	.14
SADDLERS' MATERIALS.	
1 pound linen carpet thread, No. 18 .....	.97
1 pound shoe thread, No. 3 .....	.90
3 pounds shoe thread, No. 10, half bleached .....	.90
2 pounds shoe thread, yellow, 3 and 10, each one .....	.90
24 yards red linen webbing, $\frac{3}{4}$ inches wide .....	.064
1 pound rivets and burrs, brass, $\frac{1}{4}$ -inch, No. 10 .....	.17
2 pounds rivets and burrs, brass, $\frac{1}{4}$ -inch, No. 10 .....	.17
1 pound rivets and burrs, brass, $\frac{1}{4}$ -inch, No. 8 .....	.17
1 pound rivets and burrs, brass, $\frac{1}{4}$ -inch, No. 12 .....	.17
1 gross brass screws, 1-inch, No. 6 .....	.88
1 gross iron screws, 1-inch, No. 8 .....	.48
6 buckles, iron roller, $\frac{1}{4}$ -inch .....	.01
6 buckles, iron roller, $\frac{1}{4}$ -inch .....	.01
12 buckles, iron roller, $\frac{1}{4}$ -inch .....	.01
6 buckles, iron roller, 1-inch .....	.01
8 buckles, iron roller, $\frac{1}{4}$ -inch .....	.02
18 buckles, iron roller, $\frac{1}{4}$ -inch .....	.02
6 buckles, brass bar, $\frac{1}{4}$ -inch .....	.085
2 buckles, brass bar, Saalbach, $\frac{1}{4}$ -inch .....	.085
6 buckles, brass bar, $\frac{1}{4}$ -inch .....	.04
12 buckles, brass wire, $\frac{1}{4}$ -inch .....	.01
6 buckles, iron bar, $\frac{1}{4}$ -inch .....	.01
12 buckles, iron bar, $\frac{1}{4}$ -inch .....	.02
12 buckles, iron bar, $\frac{1}{4}$ -inch, tongueless .....	.02
12 buckles, iron bar, $\frac{1}{4}$ -inch .....	.02
12 iron rings, $\frac{1}{4}$ -inch .....	.01
12 iron rings, $\frac{1}{4}$ -inch .....	.01
12 iron rings, $\frac{1}{4}$ -inch .....	.01
12 iron rings, $\frac{1}{4}$ -inch .....	.03
4 brass rings, $\frac{1}{4}$ -inch .....	.08
6 halter squares .....	.02
12 halter bolts .....	.01
6 halter swivel rings .....	.0825
6 covert snaps, 1-inch .....	.15
6 iron hooks for breast straps .....	.51
6 iron hooks for back straps .....	.25
6 iron hooks for side straps of breeching .....	.51
6 iron lead rein rollers .....	.26
6 brass foot staples, high .....	.02
6 brass foot staples, low .....	.02
6 brass foot staples, semicircular .....	.02
12 brass wire double hooks .....	.09

For
prices
see
page 627.

Six months' allowance of saddler's materials, materials for cleaning and preservation, paints, etc., for one six-gun battery of light artillery—Continued.

	Price each.
SADDLERS' MATERIALS—continued.	
12 brass wire end hooks.....	\$0.017
12 brass wire squares, 1-inch.....	.01
12 brass wire loops, 2-inch.....	.015
12 brass wire D-rings.....	.012
4 iron foot staples, high.....	.01
4 iron foot staples, low.....	.016
40 saddle nails, japanned (black or fair).....	.11
1 paper tacks, iron, 8-ounce.....	.11
1 paper tacks, iron, 8-ounce.....	.11
1 paper tacks, iron, 12-ounce.....	.11
1 paper tacks, iron, 18-ounce.....	.35
1 paper tacks, copper, 12-ounce.....	.35
1 paper tacks, copper, 20-ounce.....	.01
6 ovals for saddles.....	.01
6 ovals for saddlebags.....	.01
1 gross brass screw pins, 1-inch (per gross).....	2.25
4 lariat snap hooks.....	.06
4 lariat strap-snap hooks.....	.06
4 link strap hooks.....	.06
6 saddlebag studs.....	.03
1 saddle shield, 11-inch.....	.01
2 saddle shields, 11½-inch.....	.01
2 saddle shields, 12-inch.....	.01
4 bridle ornaments, brass.....	.04
150 pounds leather, harness, per pound:	
Black.....	.47
Fair.....	.525
4 sides leather, bridle (black).....	4.00
1 side leather, bridle, fair.....	5.18
8 sides rawhide.....	1.65
1 pound beeswax.....	.36
4 ounces white wax.....	.05
2 pounds black wax, summer or winter prepared.....	.10
15 awls, stitching, assorted.....	.06
6 awl handles, plain.....	.17
1 paper needles, harness, No. 6.....	.025
1 paper needles, harness, No. 6.....	.025
1 paper needles, glover's, No. 3.....	.085
2 needles, collar, No. 4.....	.11
2 needles, collar, No. 4½.....	.11
8 thimbles.....	.04
2 ounces bristles.....	.82
MISCELLANEOUS MATERIALS.	
2 burners for railroad lantern.....	per dozen .40
5 wicks for railroad lantern.....	do. .05
1 box stencil paste.....	.06
25 washers, leather, for wheels.....	.066
2 globes for railroad lantern.....	per dozen .75

If supplies of cleaning materials, etc., are required in excess of the allowance specified in the tables given in this chapter for use of a battery of 3.2-inch field guns, special requisition should be made for same, setting forth fully in the requisition the special necessity for the supplies.

Expendable stores will not be dropped from property returns until actually used.

Implements, equipments, parts of harness, etc., not enumerated in the fixed amounts of supply table for issue, will be issued only as required. In making requisition for such the nomenclature given in this manual should be followed. Those required to replace unserviceable ones and not expendable will be issued only after submission to inspection as required by regulations.

The cleaning materials and supplies given on pages 508-510, as contained in forge and battery wagon of light battery, will not be considered as a part of the six months' allowance when making requisition for supplies given on pages 510-512.

The former or an equal quantity is intended to be at all times kept in the forge and battery wagon. That is to say, the forge and battery wagon should at all times remain completely charged with its entire equipment ready for immediate field service.

In making requisition for saddlers, cleaning, or other materials and supplies, the

amount on hand, of each kind required, must always be given before the requisition will receive consideration.

Coal oil is issued only for use in lanterns forming part of the battery equipment.

Cosmic No. 80, soft, is supplied instead of cosmoline and vaseline for use in preservation from rust of light surfaces of guns and carriages.

Oils required for use with a field battery to fill battery oil cans are issued in cans which are not a part of the battery equipment, are not invoiced, and should not be taken up on property returns.

ARTILLERY HARNESS.

[Component parts.]

A set of artillery harness, wheel and lead, is composed of the following:

Component parts.	Weight.	Price.							
		Wheel.				Lead.			
		Black leather.		Fair leather.		Black leather.		Fair leather.	
		Near horse.	Off horse.	Near horse.	Off horse.	Near horse.	Off horse.	Near horse.	Off horse.
Breast strap:									
Body		\$0.74	\$0.74						
Double hooks (2) .....		.61	.61						
Breeching:									
Back strap		1.12	1.12						
Hip straps									
Double hook for back strap .....		.26	.26						
Dock .....		.26	.26						
Body		1.70	1.70						
Loin strap .....		.22	.22						
Trace loops (2) .....		.42	.42						
Side straps (2)		1.17	1.17						
Double hooks for side straps .....		.61	.61						
Back strap and crupper:									
Body						\$1.07	\$1.07		
Hip straps									
Dock .....						.26	.26		
Loin straps .....						.22	.22		
Trace loops (4) .....						.84	.84		
Double hook .....						.26	.26		
Bridle:									
Curb bit, pickled		2.04	2.04			2.04	2.04		
Curb strap .....		.27	.27			.27	.27		
Cheeks (2) .....		.62	.62			.62	.62		
Crown .....		.19	.19			.19	.19		
Reins .....		.80	.80			.80	.80		
Throatlatch .....		.12	.12			.12	.12		
Brow band .....		.29	.29			.29	.29		
Brow-band ornaments (2) .....		.14	.14			.14	.14		
Coupling strap .....			.76				.76		
Halter:									
Headstall		1.43	1.43			1.43	1.43		
Strap .....		.42	.42			.42	.42		
Leg guard		2.26							
Martingale:									
Martingale		2.47	2.47						
Cincha strap									
Saddle:									
Tree									
Leather covering for tree		6.67	6.67			6.67	6.67		
Rawhide covering for tree									
Quarter strap, self-adjusting:									
Front .....		.41	.41			.41	.41		
Rear .....		.42	.42			.42	.42		
Safes and rings for quarter strap (2) .....		.36	.36			.36	.36		
Cincha		1.54	1.54			1.24	1.24		
Cincha straps (2) .....		.90	.90			.90	.90		
Stirrups, brams (2)		2.00	2.00			2.00	2.00		

Component parts.	Weight.	Price.							
		Wheel.				Lead.			
		Black leather.		Fair leather.		Black leather.		Fair leather.	
		Near horse.	Off horse.	Near horse.	Off horse.	Near horse.	Off horse.	Near horse.	Off horse.
Saddle—Continued.									
Stirrup straps (2)		\$1.00	\$1.00			\$1.00	\$1.00		
Rawhide thongs (3)		.15					.15		
Rawhide thongs (2)			.10						
Rawhide thongs (4)						.20			
Lead rein roller and strap			.28				.28		
Cantle hook		2.65	2.65						
Saddlebag:									
Saddlebag		5.08	5.08			5.08	5.08		
Saddlebag side straps (2)		.40	.40			.40	.40		
Traces, wheel (2)		7.48	7.48						
Traces, lead (2)						8.94	8.94		
Trace chains (2)						5.36	5.36		
Trace-chain and springs (2)		12.60	12.60						
Whip		2.80				2.80			
Collars, steel		9.00	9.00			9.00	9.00		
Total cost		71.49	69.08			53.81	53.65		
Total weight									
Total weight, boxed									

Price of harness sacks, \$4 each.

Price of harness, russet leather, set for two wheel horses, \$156 per set; for two lead horses, \$123 per set.

Wire traces, leather covered, have been adopted for future manufacture and issue as part of artillery harness.

In issuing harness each set of harness for two horses is separately boxed and the box plainly marked, showing the kind of harness, size of collar, etc.

Special harness for the artillery store wagon is no longer issued, the regulation artillery harness, wheel and lead, being issued instead, drivers being mounted as for the guns, caissons, etc. Price of harness for artillery store wagon, set for two lead horses, \$93.16; for two wheel horses, \$114.25.

Harness sacks are not included in the equipment of a field battery, and are only issued upon special requisition fully setting forth the necessity for their issue.

Horse covers are issued for use with light batteries only when specially called for, and in all such cases the requisition should fully set forth the facts making such issue necessary.

Cinchas for field battery are issued in the following proportions:

Wheel harness—

24 inch, 20 per cent.

28 inch, 75 per cent.

28 inch, 5 per cent.

Cinchas for field battery are issued in the following proportions.—Continued.

Lead harness—

22 inch, 25 per cent.

24 inch, 75 per cent.

If proportions varying from this are required the fact should be so stated in the requisition.

Surcingle for field artillery are issued in three lengths and in the proportions following:

No. 1, length of webbing, 50½ inches; billet, 30½ inches.

No. 2, length of webbing, 66 inches; billet, 18 inches.

No. 3, length of webbing, 66 inches; billet, 30 inches.

Requisitions should state fully which are required, and in what proportions, if desired, other than here given.

In making requisition for snap hooks requisition must give the kind of snap hooks required, i. e., double snap hook, cavalry canteen snap hook, halter snap hook, halter chain snap hook, etc.

INDIVIDUAL HORSE EQUIPMENT FOR ARTILLERY SOLDIER.

The individual horse equipment for the artillery noncommissioned officer is the same as that for the cavalry soldier, excepting the carbine scabbard and straps, which are not issued to the artillery soldier. The saddle blanket for artillery is gray. See page 628.

HORSE COLLARS.

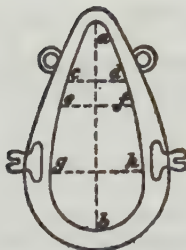
Steel horse collars are supplied with all artillery harness. The component parts of a collar are:

Component parts.	Weight.	Price.
	<i>Lbs. ozs.</i>	
2 collar sides, right and left.....		
1 top connection.....		
2 top-connection bolts and nuts.....		
1 pad hook.....		
1 pad.....		
1 pad bolt and nut.....		
1 back strap.....		
1 back-strap hook.....		
1 collar wrench.....		
1 back-strap connection.....		
2 extensions, right and left.....		
2 bolts and nuts for extension.....		
2 trace plates, right and left.....		
6 trace-plate bolts and nuts.....		
2 draft attachments.....		
2 braces for bottom of collar.....		
4 bolts and nuts for bottom of collar.....		
1 buckle latch.....		
1 buckle spring.....		
Total.....		\$9.00

All of these component parts except the collar sides are issued upon requisition for repairs and are expendable.

Dimensions of collars.

No.	Size of collars fitted with No. 3 pads.				Size of collars fitted with No. 1 pads.				Price.
	Length of collar inside a-b.	Width 6 inches from top inside c-d.	Width 8 inches from top inside e-f.	Width at draft g-h.	Length of collar inside a-b.	Width 6 inches from top inside c-d.	Width 8 inches from top inside e-f.	Width of draft g-h.	
	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Each.</i>
2 A.....	18	6½	7½	8½	16½	5½	5½	7	\$9.00
2 B.....	18	6½	6½	8	16½	4½	5½	6½	9.00
4 A.....	19½	7	7½	8½	18	5½	6½	7½	9.00
4 B.....	19½	6½	7½	8½	16	5½	5½	7½	9.00
6.....	22½	7½	8½	9½	21	6½	7½	8½	9.00
6 A.....	22½	7	7½	9½	21	6	6½	8½	9.00
6 B.....	22½	7	7½	9½	21	6½	7½	8½	9.00
7.....	24	7½	8½	10½	22½	6½	7½	8½	9.00
7 A.....	24	7	7½	9½	22½	6½	6½	8½	9.00
7 B.....	24	7	7½	10	22½	5½	6½	8½	9.00
8 A.....	25½	7	7½	9½	24	5½	6½	8½	9.00



The table of dimensions of collars gives the largest and smallest size that each collar can be made with the No. 3 and No. 1 pads. By adding one-half inch in length and width to the smallest dimensions it will give the intermediate size of the collars when fitted with No. 2 pads. These examples are given to show the three regular adjustments in each size of collar. But these dimensions can be varied to suit the different shapes of the necks. The largest pad can be put in the top of the collar and the bottom taken in to its smallest dimensions, or the smallest pad can be put in the top, and the bottom let out.

In addition to Nos. 1, 2, and 3 pads, there is No. 0, which is one-half inch narrower than No. 1, and Nos. 4, 5, and 6, which are wider than No. 3, and can be used in any size of collar.

The buckle is made in two sizes. The No. 2 buckle is 1 inch longer than the No. 1 and is used in connection with the longest size of pads.

In the A and B shapes a top connection two numbers larger than the number of the pad is required; that is, it takes a No. 3 connection with a No. 1 pad for the regular adjustments in the A and B shapes. When a collar needs to be very wide at the top and narrow at the bottom, the size of the connection will have to be increased one or two numbers to allow the collar to close easily at the bottom. If the case is reversed, a smaller connection will be used.

In fitting up irregular shapes none of the connections may give just the proper tension on the pad. In such a case use the one that comes nearest and straighten or bend the extension at the top. When the collar requires to be widened at the top to relieve the pressure on the pad and make it lock easily at the bottom, open the collar wide and place a round piece of hard wood or iron 1 inch in diameter and 2 inches long between the connection and collar side close up to hinge, then press the sides together and bend both sides alike, so that they will be the same length at the bottom. Do not let the fulcrum rest on the pads, for it will bend the latter.

If the collar sides require straightening to close them tighter on the pad and give more tension on the latch at the bottom, open the collar at the bottom and take the wrench and hook it over the top of the collar side and press down on the lever, treating both sides alike. Both of these operations can be performed with the collar put together.

The number and shape of collar is stamped on the front side under the extension bolt. The pad is numbered on the front inner side. The top connection is numbered on the side having the round holes, which must be kept to the front of the collar.

In making requisition for the top connection for collars it is absolutely essential that the number of the connection required be given in the requisition, as the requisition can not be filled until such information is at hand.

MISCELLANEOUS PROVISIONS AS TO FIELD BATTERY ISSUES.

For saluting charge (black powder) for 3.2-inch B. L. rifle, see page 355.

Revolver arm racks are issued for use of field artillery in such numbers as may be required to hold the revolvers on hand in battery. For component parts of arm rack, see page 643.

One breech strap (price each, 98 cents) is issued with each 3.2-inch field carriage as part of the carriage. Additional straps will be issued upon requisition as required.

Lanterns with Cranston attachments are no longer issued except when specifically called for. Railroad lanterns are issued instead. (Price of Cranston lantern, \$4. 16.)

Fair leather is issued to field batteries, equipped with black leather horse equipment, only in such quantities and kinds as shall be required from time to time to repair personal horse equipment (fair leather) that is on hand (if any) in the battery.

All paints issued to light batteries are issued mixed ready for use.

Padlocks for field batteries are issued (with chains and two keys for each) one for each ammunition chest, forge chest, and arm rack, and two for the body of forge and battery wagon. (Price of locks, 50 cents each.)

Picket rope for light batteries is issued in sections of 30 feet in length, with metal screw joints to permit extending line to any desired length.

Copper rivets and burrs are no longer issued. Brass only will be issued.

Sperm oil is issued as a lubricant for the mechanisms of guns and carriages only.

Stitching horses are issued for post use only.

Waist belt with saber attachments is now issued to the mounted service in lieu of the saber belt. Hasps are no longer riveted to the belt, but are issued with the belt plates. (Par. II, G. O., 54, A. G. O., 1900.)

The allowance of whips per battery of field artillery is one to each set of harness for two horses. Whips are not expendable. Extra whips are supplied only as required.

Asphalt varnish is no longer issued to the service, stove enamel being issued instead.

In making requisition for sash cord the requisition should clearly state the purpose for which the sash cord is required, i. e., for halyards, for sliding targets, for light batteries, etc.

In making requisition for cleaning materials for horse equipment the requisition should state the kind of equipment for which materials are required, fair or black leather.

All poles, doubletrees, singletrees, and neck yokes for 3.2-inch field battery are interchangeable.

Nave boxes and nave-box flange bolts are interchangeable for all vehicles supplied to the 3.2-inch field battery.

The supply of ammunition to be kept on hand in a field battery of 3.2-inch B. L. guns will be a sufficient quantity to fill all the ammunition chests of the equipment, and in addition a sufficient number of rounds to cover the needs for annual target practice.

The following nomenclature as to rammers and staffs for 3.2-inch field gun should be followed:

Rammer and staff, bore, complete.

Sponge and rammer, bore.

Sponge head, bore.

Rammer head, bore.

Sponges, woolen, bore.

Sponge and rammer staff, chamber, complete.

Sponge and rammer, staff, chamber.

Sponge head, chamber.

Rammer head, chamber.

Sponges, woolen, chamber.

In making requisition for repairs for 3.2-inch field-gun carriages, caissons, etc., the number of the gun carriage, caisson, forge, and battery wagon, etc., must invariably be given. This is necessary, as there are several models of field-gun carriages and caissons in existence, and, although all the earlier models of these gun carriages and

caissons which have passed through Rock Island Arsenal have had attached all the latest improvements, still these improvements are not interchangeable; that is, the particular article which has been modified to fit the earlier model of carriage will not fit the later model of carriage, caisson, etc.

In making requisition for bolts, nuts, etc., required for 3.2-inch field carriages, caissons, etc., it is important that there be given the sizes of the bolts as shown in the tables of bolts and material in this manual, also the number of the carriage, caisson, etc., for which required. The nomenclature given in this manual should in all cases be strictly followed.

In making requisition for assembled parts of carriage, limber, etc., the requisition should clearly state what part is required. It is not clear to state a "frame" or "body" is wanted. It should state if the "frame" is wanted without wheels, or wheels and frame only, or the frame with ammunition chest and no wheels, or the frame and ammunition chest with wheels complete, etc.

All new field material issued in the future will be painted with khaki-colored paint.

The cast-iron brake shoes of 3.2-inch caissons are being replaced by shoes made of bronze and the shape slightly changed.

The poles and pole seats of 3.2-inch limbers have been modified and changed, stronger poles and pole seats being adopted.

Canvas bags for railroad lanterns furnished to light batteries and siege batteries will be furnished upon requisition, 1 for each lantern, if so desired.

THE NEW 3-INCH FIELD GUN AND EQUIPMENT.

The description, list of parts of gun, carriage, caisson, etc., the maker of a battery and complete data as to tools, implements, materials, etc., to be issued and annual supply for same, will be furnished in the form of a pamphlet addenda as soon as these guns are issued to the service and the data has all been completed and definitely determined.

TARGETS FOR LIGHT BATTERY OF FIELD ARTILLERY.

If two or more batteries are stationed at the same post they will alternate target practice in order that a single set of target frames may serve for all batteries. If there is but one battery at a post a set of target frames will be issued to such battery.

Targets for batteries of artillery are designated as follows:

- Standing figure, D.
- Kneeling figure, E.
- Horse and man, cavalry, K.
- Horse artillery, Ka.
- Gun and carriage, M.
- Limber or caisson, N.

A set of light artillery targets and material is composed of the following:

One year's supply.	Price each.
4 gun and carriage target frames (steel), O	\$4.51
40 gun and carriage cloth silhouettes, O	.35
80 gun and carriage paper silhouettes, O	.025
4 caisson target frames (steel), P	5.08
40 caisson cloth silhouettes, P	.31
80 caisson paper silhouettes, P	.025
16 horse target frames (steel), N	3.41
8 horse target frames (steel), M	5.96
160 horse cloth silhouettes, N	.26
80 horse cloth silhouettes, M	.30
820 horse paper silhouettes, N	.025
160 horse paper silhouettes, M	.02
48 skirmish target frames, H (steel)	1.72
48 skirmish target frames, D (steel)	1.94
240 skirmish cloth silhouettes, D	.11
960 skirmish paper silhouettes, D	.01
240 skirmish cloth silhouettes, H	.14
960 skirmish paper silhouettes, H	.02
5 boxes pasters, black (500 each)	.30
4 brushes, kalsomine, 8 inch	2.05

Repairs for targets will be furnished for the iron target frames from time to time, as required, upon requisition.

Pasters 2 inches in diameter (black) for silhouette field target have been designed and adopted and will be issued to the service upon requisition. The allowance will be 2,500 per annum.

ARTILLERY LAND TARGET.

There are also issued to field batteries "Artillery land targets," one per gun per battery. For a full description of same see pamphlet "Description of the Artillery and Small-Arm Targets," published by the Ordnance Department.

If two or more batteries of field artillery are stationed at the same post, they will alternate target practice in order that a single set of land targets may serve for all batteries. If more than one battery be stationed at a post, the land targets are issued to the post ordnance officer and by him allotted to the batteries for target practice as needed. If there be but one battery at post, a set of land targets will be issued to the commanding officer of such battery.

The component parts of target are:

Components of artillery land target.

Number of pieces.	Name of parts.	Finished dimensions of each piece.			Contents (superficial feet).		Remarks.	Price each.
		Length.	Width.	Thickness.	Each piece.	Total.		
		<i>Feet.</i>	<i>Inches.</i>	<i>Inches.</i>				
1	Plate.....	20	4	2	13.3	26.6	Spruce.....	
1	Sill.....	20	4	2	13.3		do.....	
4	Uprights.....	10	4	2	6.6		Oak.....	
4	Stakes (for guy ropes)...	3	2	2	1	4		
2	Guy ropes.....	42	a	Round.	6 lbs.	12 lbs.	Manila.....	
1	Cover.....	20	120		200	200	Cotton cloth.....	
18	Nails.....						1 pound 80-penny nails, steel wire.	
	Total.....						Total.....	\$9.00

a Diameter.

Any of the above parts or material will be issued for repairs as required.

DUMMY PROJECTILES AND CARTRIDGES.

Dummy projectiles and cartridges for drill and instruction purposes are issued to batteries of light artillery in the proportion of two shell and cartridges for each gun.

PERSONNEL EQUIPMENT OF BATTERY OF LIGHT ARTILLERY.

The equipment of the light-artillery soldier is as follows:

	Weight.	Price.	
		Black leather.	Fair leather.
	<i>Lbs. ozs.</i>		
1 revolver, caliber .38.....		\$11.00	\$11.00
1 revolver holster, caliber .38.....		.83	.96
1 revolver-cartridge belt, woven (with ring for saber attachment).....		1.00	1.00
1 waist belt.....		.42	.50
1 waist-belt plates.....		.22	.22
1 cartridge box, revolver.....		.57	
1 canteen.....		.33	.33
1 haversack.....		.85	.85
1 knapsack, artillery.....		4.00	4.00
2 canteen-haversack straps.....		.62	.69
1 meat can.....		.19	.19

a If waist-belt buckle is used, price is 10 cents each.

	Weight.	Price.	
		Black leather.	Fair leather.
	<i>Lbs. ozs.</i>		
1 tin cup.....		\$0.10	\$0.10
1 knife.....		.04	.04
1 fork.....		.04	.04
1 spoon.....		.02	.02
The noncommissioned officers, musicians, etc., mounted separately, will be equipped, in addition to the above, with the following:			
1 saber (light artillery and cavalry).....		6.00	6.00
1 saber attachment, with slings.....		1.29	1.29
1 saber belt slide.....		.11	.11
1 saddle, complete, cavalry.....		14.31	16.26
1 pair saddlebags.....		5.05	5.90
1 saddle cover, duck.....		.95	.95
1 pair spurs.....		.74	.74
1 pair spur straps.....		.11	.14
1 bridle, curb.....		4.00	4.30
1 currycomb.....		.22	.22
1 horse brush.....		.97	.97
1 link.....		.23	.30
1 canteen strap, cavalry.....		.21	.25
Each driver will be equipped, in addition to the equipment named in first paragraph, with:			
1 currycomb.....		.22	.22
1 horse brush.....		.97	.97
For each horse, except officers' and spare horses, there will be furnished:			
1 saddle blanket.....		2.70	2.70
1 watering bridle.....		1.18	1.33
1 halter headstall.....		1.65	1.89
1 halter strap.....		.41	.49
1 lariat.....		.78	.78
1 nosebag.....		.96	1.04
1 picket pin.....		.35	.35
1 sureingle.....		.69	.85
For each battery, as part of original equipment:			
1 stirrup, with hood and socket for girdon.....		1.00	1.88
20 cinchas, extra.....		1.31	1.45
2 arm racks, revolver.....		29.16	

Cleaning materials for the personnel of a light battery are of the same description as those issued to the infantry. The allowance per battery is four boxes of cleaning materials per annum (included in the 6 months' supply table). For list of contents see page 627.

Marking and stencil outfits for light batteries are of the same pattern as those issued to infantry. See page 637 for components, etc.

3.6-INCH B. L. RIFLE, MODEL 1891.

A battery of 3.6-inch B. L. rifles is equipped in the same manner as a 3.2-inch rifle battery. The carriages issued for these guns are part of the original 50 heavy 3.2-inch field carriages, model 1885, with the mount, changed slightly in dimensions to permit the mounting of the 3.6-inch rifle. The caisson is the same as for the 3.2-inch guns, with the ammunition chests altered to hold 36 rounds of ammunition instead of 42.

The component parts of carriage, limber caisson, sights, etc., are as given for the 3.2 guns on pages 472-481.

The equipment furnished for a battery of 3.6-inch B. L. rifles, tools, supplies, etc., are the same in kind and quantity as for the 3.2-inch guns (see pages 505-510).

Three elevating devices are in use on the carriage for the 3.6-inch B. L. rifles—the lazy-tongs elevating device with side crank, lazy-tong elevating device with wheel on top, and double-screw elevating device, same as for the 3.2-inch rifles.

The 3.6-inch B. L. rifles are no longer issued for field artillery. They are issued to colleges for instruction purposes and to seacoast fortifications for use as morning and evening guns and firing salutes.

Weight, dimensions, etc., of 3.6-inch B. L. rifle, model 1891.

Weight, 1,200 pounds.
 Distance between rimbases, 9.5 inches.
 Length of trunnions, 3 inches.
 Distance of axis of trunnions from muzzle, 57.25 inches.
 Total length, 7.79 feet.
 Length of bore, 23.5 calibers.
 Maximum diameter of breech, 9.8 inches.
 Diameter of muzzle, 6 inches.
 Diameter of trunnions, 3.8 inches.
 Powder chamber:
 Diameter, 3.9 inches.
 Length, 12.275 inches.
 Capacity, 148.5 cubic inches.
 Travel of projectile in bore, —. Caliber, 72.275 inches.
 Projectile:

Kind.	C.-I. shell.	Shrapnel.
Weight (filled) pounds..	20	20
Ratio of weight to weight of piece.....	$\frac{1}{10}$	$\frac{1}{10}$
Weight of bursting charge (rifle powder) ounces..	12.8	4
Length, calibers	3.2	≈ 2.5
Sectional density	1.96	1.96
Price.....	$\approx \$2.00$	$\approx \$3.26$

^a Without fuse.

Powder:

Weight: Black, 4.375 pounds; smokeless, 23 ounces.
 Density of loading: Black, 0.8155; smokeless, 0.2680.
 Muzzle velocity: Black and smokeless, each 1,550 feet per second.
 Maximum pressure per square inch: Black and smokeless, each, 35,000 pounds.
 Price of gun, \$1,240.

Muzzle energy: Black and smokeless, each 333 foot-tons.

Rifling:

Number of grooves, 26.
 Width of grooves, 0.3 inch.
 Depth of grooves, 0.04 inch.
 Width of lands, 0.1188 inch.
 Twist of rifling, 1 turn in 50 calibers at origin, increasing to 1 turn in 25 calibers at — inches from muzzle, being uniform over the — inches.

POWDER NOTE.—The weights given are approximate. The exact weight giving the standard muzzle velocity is determined from the acceptance test and issue for charges. If any doubt exist as to the proper charge the same should be obtained from the office of the Chief of Ordnance.

3.6-INCH B. L. RIFLE, MODEL 1891.

The designation, "one 3.6-inch B. L. rifle, model 1891," in correspondence, invoices, receipts, requisitions, etc., comprises the gun body, with its attached parts, and the breech mechanism (as per list below).

In filling a requisition for a gun of this model it is customary to issue thereon the following articles, which are mentioned in the invoices: One rear sight (tangent), one rear-sight pouch, one front sight (tangent) with four screws, one front-sight cover, one telescopic sight (one telescopic-sight case, not invoiced). (Par. II, Ord., Ord. No. 41, a. 1885.)

List of parts constituting "one breech mechanism, 3.6-inch B. L. rifle, model 1891."

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One block carrier, complete:					
Hinge pin	1	Steel....	Hinges block carrier to breech.	Interchangeable all 3.6-inch, model 1891.	
Hinge-pin screw....	1	....do...	Screws hinge pin to gun.	....do.....	
Block carrier	1	....do...	Encircles breechblock	....do.....	Carrier ring.
Block stop.....	1	....do...	Through block carrier near hinge; governs motion of breechblock through block carrier.	Requires careful fitting to seat.	Guide bolt, stop bolt, stop.
Block-stop screw ...	1	....do...	Secures stop bolt	Interchangeable all 3.6-inch, model 1891.	Stop-bolt screw stop screw.
Carrier latch bolt...	1	Norway iron.	In latch recess in block carrier (opposite hinge).	Interchangeable all 3.6-inch, model 1891.	Latch, latch-pin latch bolt.
Carrier latch spring	1	Steel....	In latch recess behind latch bolt.	....do.....	
Carrier latch cover ..	1	....do...	Covers latch recess .....	....do.....	Latch housing.
Carrier latch screws	2	....do...	Secure latch cover to block carrier.	....do.....	Latch-cover screws, latch-housing screws.
One breechblock, complete:					
Breechblock.....	1	Steel....	In breech of gun. Secured to block carrier by stop bolt (and, when breech open, by latch bolt).	Interchangeable all 3.6-inch, model 1891.	Breech-plug breech screw.
Block handle.....	1	Bronze ..	Rear end of breechblock.	....do.....	Handle.
Block handle screws	2	Steel....	Secure handle to breechblock.	New ones will fit any 3.6 or 3.2-inch gun, but if removed can not be used again on account of fit.	Handle screws.
Block lever.....	1	....do...	Rear end of breechblock in lugs.	Interchangeable all 3.6-inch, model 1891.	Lever, rotating lever, lever handle.
Block-lever pivot...	1	....do...	Through end of lever handle and lugs of breechblock.	....do.....	Lever (or lever-handle) pin.
Block-lever screw ..	1	....do...	Through end of lever handle into pivot.	....do.....	Lever-handle set screw.
Vent cover	1	....do...	Rear end breechblock in slot.	....do.....	
Vent-cover stud	1	....do...	Screwed into end of vent cover.	Not to be removed from vent cover.	
Vent-cover housing.	1	....do...	Covers recess for vent cover.	Not interchangeable, account seat for screw.	Guideway cover.
Vent-cover screw...	1	....do...	Fastens vent-cover housing to breechblock.	Interchangeable all 3.6-inch, model 1891.	
One obturator, complete:					
Obturator spindle, complete—					
Obturator spindle	1	Steel....	Through center bore of breechblock.	Spindle and nut not issued separately, account spline-screw seat. Spindle and nut fit any gun or breechblock.	Spindle, obturator, mushroom, mushroom-head and spindle. (The term "obturator" should never be used for "obturator spindle.")
Vent bushing.....	1	Copper ..	In center of obturator spindle.	Interchangeable screwed in and riveted.	
Obturator nut	1	Steel....	Halved in spindle and nut.	Interchangeable all 3.6-inch, model 1891.	Spindle nut.
Obturator spline screw.	1	....do...			Obturator-nut spline screw, spindle-spline screw.
Obturator spring ...	1	....do...	On spindle forward of nut.	....do.....	Spindle spring.
Rear gas-check cup.	1	....do...	On spindle forward of breechblock.	....do.....	

List of parts constituting "one breech mechanism, 3.6-inch B. L. rifle, model 1891"—Cont'd.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One obturator, complete—Continued.					
Front gas-check cup	1	Steel ...	On spindle forward of pad.	Interchangeable all 3.6-inch, model 1891.	
Small split ring	1	....do ...	Between rear cup and pad on obturator spindle.	....do	
Gas-check pad	1	Asbestos and tallow in canvas.	On spindle between cups.	....do	Gas-check, pad.
Copper washers	2	Copper	On, and protecting, outer edges of pad.	....do	

PARTS ATTACHED TO GUN BODY, BUT REMOVABLE.

Retracting stud	1	Steel ...	In recess for block carrier (opposite latch).	Interchangeable all 3.6-inch, model 1891.	Conical stud, operating stud, latch stud.
Rear sight socket	1	....do ...	In dovetail slot, right side breech.	Not to be removed unless broken. Must be carefully fitted to seat.	Sight socket.
Rear sight socket screw.	1	....do ...	Secures sight socket to gun, riveted.	Interchangeable all 3.6-inch, model 1891.	
Telescopic sight bracket.	1	Bronze	On sight trunnion		
Telescopic sight bracket screw.	$\left\{ \begin{array}{l} 1 \\ \text{or} \\ 8 \end{array} \right\}$	Steel ...	Secures bracket to right trunnion.	See note	

Price of gun, \$1,169.

NOTE.—Two forms of telescopic-sight bracket have been made. The old form was fastened to the gun by three screws. The new form is fastened to the gun by a dovetailed slot and one screw. The guns fitted for the old form of bracket and those not yet fitted for any are to be fitted for the new form of bracket when convenient. The screws for the two forms of bracket are of different dimensions. Requisitions should state which form of brackets and screws are desired.

3.6-INCH B. L. MORTARS, MODEL 1890.

The composition and equipment of 3.6-inch mortar battery has not been definitely determined.

Weight, dimensions, etc., of 3.6-inch B. L. mortar, model 1890.

Weight, 245 pounds.

Distance between rimbases, 9.5 inches.

Length of trunnions, 2.5 inches.

Distance of axis of trunnions from muzzle, 14.6 inches.

Total length, 2.05 feet.

Length of bore, 5.3 calibers.

Maximum diameter of breech, 7.8 inches.

Diameter of muzzle, 5.4 inches.

Diameter of trunnions, 3.8 inches.

Powder chamber:

Diameter, 3.8 inches.

Length, 2.835 inches.

Capacity, 33.2 cubic inches.

Travel of projectile in bore, — calibers, 16.065 inches.

Projectile:

Kind.	C. I. shell.	Shrapnel.
Weight, filled and fused.....pounds..	20	20
Ratio of weight to weight of piece.....	$\frac{1}{4}$	$\frac{1}{4}$
Weight of bursting charge (rifle powder).....ounces..	12.8	4
Length.....calibers..	3.3	a 2.5
Sectional density	1.96	1.96
Price.....	a 2.00	a 3.25

a Without fuse.

Powder:

Kind, black, smokeless.

Weight, spherohexagonal, 15 ounces; smokeless, .30 caliber rifle, 6 ounces.

Density of loading, spherohexagonal, 0.7816; smokeless, .30 caliber rifle, 0.3127.

Muzzle velocity:

Black powder, 650 feet per second.

Smokeless powder, 690 feet per second.

Maximum pressure per square inch:

Black powder, 16,000 pounds.

Smokeless powder, 17,000 pounds.

Muzzle energy:

Black powder, 59 foot-tons.

Smokeless powder, 66 foot-tons.

Rifling:

Number of grooves, 20.

Width of grooves, 0.4454 inch.

Depth of grooves, 0.045 inch.

Width of lands, 0.12 inch.

Twist of rifling, one turn in 40 calibers at origin. One turn in 25 calibers at — inches from muzzle, being uniform over the — inches.

POWDER NOTE.—The charge of powder given is the maximum charge. The weight of charge varies with the range. For issues in bulk the average charge is assumed to be three-fourths of the maximum.

3.6-INCH B. L. MORTARS, MODEL 1890.

NOTE.—Quadrant and all other articles for use with this mortar which are not listed below are issued with "Implement chest," or with carriage, with case.

List of parts constituting one breech mechanism, 3.6-inch B. L. mortar, model 1890.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One block carrier, complete:					
Hinge pin	1	Steel ...	Hinges block carrier to breech.	Interchangeable all 3.6-inch mortars.	
Hinge-pin screws...	2	...do...	Secure hinge pin to block carrier.	...do...	
Block carrier.....	1	...do...	Encircles breechblock.	...do...	Carrier ring.
Block stop.....	1	...do...	Through block carrier near hinge; governs motion of breechblock through block carrier.	...do...	Stop bolt, guide-bolt stop.
Carrier-latch bolt...	1	Norway iron.	In latch recess in block carrier (opposite hinge).	...do...	Latch, latch pin, latch bolt.
Carrier-latch spring.	1	Steel ...	In latch recess in block latch bolt.	...do...	

List of parts constituting one breech mechanism, 3.6-inch B. L. mortar, model 1890—Cont'd.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
One block carrier, complete—Cont'd.					
Carrier-latch cover.	1	Steel ...	Covers latch recess....	Interchangeable all 3.6-inch mortars.	Latch housing.
Carrier-latch screws	2	....do...	Secure latch cover to block carrier.	....do.....	Latch-cover screws, latch-housing screws.
One breechblock, complete:					
Breechblock	1	Steel ...	In breech of gun. Secured to block carrier by stop bolt (and, when breech open, by latch).	Interchangeable all 3.6-inch mortars.	Breech plug, breech screw.
Block handles.....	2	....do...	In slots rear end breechblock.	Not interchangeable.	
Block-handle screws.	2	Steel ...	Secure handles to block.	Interchangeable all 3.6-inch mortars.	
One locking-bolt, complete—					
Vent cover	1	....do...	Attached to locking bolt.	....do.....	
Locking bolt.....	1	....do...	In edge of breechblock, rear end.	Not issued separately. Together fit any 3.6-inch mortar.	
Locking-bolt handle.	1	....do...	On lock bolt.....		
Locking-bolt washer.	1	....do...	....do.....	Interchangeable all 3.6-inch mortars.	
Locking-bolt pin.	1	....do...	Secures locking bolt to its handle.	....do.....	
Locking-bolt securing screws.	2	....do...	In breechblock, extending into slot in locking bolt.	Interchangeable ...	
Vent-cover stop screws.	2	....do...	Rear of breechblock. Stop rotation of bolt by striking side of vent cover.	Interchangeable all 3.6-inch mortars. Are issued with cylindrical heads, which must be filed off after insertion, to allow proper motion of the vent cover.	
Vent-cover catch screws.	2	....do...	Rear of breechblock; hold vent cover in place, open or shut, by catching in seats under side of vent cover.	Interchangeable all 3.6-inch mortars.	
One obturator, complete:					
One obturator spindle, complete—					
Obturator spindle.	1	Steel ...	Through center bore breechblock.	Not issued separately, account spline screw seat. Spindle and nut fit any 3.6-inch mortar.	Obturator, spindle, mushroom head and spindle. (The term "obturator" should never be used for "obturator spindle.")
Vent bushing.....	1	Copper .	In center of obturator spindle head.	Interchangeable. Driven in and riveted.	
Obturator nut	1	Steel ...	Rear end spindle.....	.....	Spindle nut.
Obturator lock nut (some guns).	1	....do...	.....	.....	Spindle-lock nut.
Obturator spline screw.	1	....do...	Halved into spindle and nut.	Interchangeable all 3.6-inch mortars.	Spindle (lock) nut-spline screw.
Obturator spring...	1	....do...	On spindle front end breechblock.	....do.....	Spindle spring.
Gas-check ring (Freyre).	1	....do...	Front end spindle....	Not interchangeable. Must be ground to a fit in the gun.	

List of parts constituting one breech mechanism, 3.6-inch B. L. mortar, model 1890—Cont'd.

PARTS ATTACHED TO GUN BODY, BUT REMOVABLE.

Official name of part.	No.	Material.	Location, etc.	Remarks.	Synonymous names used in service, shops, etc.
Retracting stud	1	Steel....	Recess for block carrier (opposite latch).	Interchangeable all 3.6-inch mortars.	
Rear sight.....	1	Steel, blued.	Upper side breech.....	do	
Rear-sight screws	2	Steel....	do	do	
Front sight.....	1	Steel, blued.	Upper side muzzle	do	
Hinge lug	1	Steel....	Breech	Not to be removed.	
Hinge-lug screws.....	2	do	Breech, riveted.....	do	
Eyebolts and rings.....	2	do	1 eyebolt with ring each trunnion.	Rings and bolts not separable. Interchangeable all 3.6-inch mortars.	
Elevating arc.....	1	do	Under side gun.....	Not interchangeable	
Elevating-arc bolts.....	4	do	do	Interchangeable all 3.6-inch mortars.	

Price of gun, \$351.

NOTE.—A few mortars still have spindle nut and spindle-lock nut, with a spline screw halved into the spindle and lock nut. These guns use nonobturating field-gun friction primers. As soon as practicable they will be altered to the present design, for use of threaded primer. When so altered they will have no lock nut, the spindle nut being secured to spindle directly by a spline screw halved into the spindle and nut.

SIGHTS.

The 3.6-inch B. L. mortar has both a front and rear sight, but they are mere direction sights. The front sight consists of a steel point fixed at the muzzle. The rear sight resembles the buckhorn sight for small arms, and is attached to the rear of the mortar by two screws.

QUADRANTS.

One gunner's quadrant is issued with each mortar. For description, etc., see pamphlet published by Ordnance Department, "Handbook of Sights for Cannon, 1899."

FUSES.

The following fuses are used for 3.6-inch B. L. mortar projectiles:

High resistance base fuse C, for shell. For prices see pages 345-347.

High resistance 28-second combination fuses, for shrapnel. For prices see page 347.

For list of parts of fuses, see pages 345-347.

For full description of fuses, see pamphlet, "Fuses for Field, Siege, and Seacoast Powder-Charged Shell and Shrapnel," issued by Ordnance Department.

PRIMERS.

The following primers are used with 3.6-inch B. L. mortar:

Friction primers, obturating (screwed). For prices see page 352.

For list of spare parts issued with these guns, see page 528.

3.6-INCH B. L. MORTAR CARRIAGE, MODEL —.

List of parts and materials, with correct nomenclature, etc.

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Remarks.
				<i>Inch.</i>	<i>Inch.</i>	
Cap square.....	On frame.....	Steel or wrought iron.	2			
Cap square keys.....	.....do.....	Steel.....	2			
Cap square key chain.....	.....do.....	Wrought iron.....	2			
Cap square key chain eye pin.	.....do.....	Steel.....	2	0.5	1.4	Diameter of thread; length over all.
Chin bolt.....	Part of frame.....	Cast steel.....	2			
Clamp, elevating.....	On clamp shaft.....	Steel.....	2			
Clamp shaft.....	On frame.....	.....do.....	1			
Clamp shaft nut.....	On clamp shaft.....	.....do.....	1	.75	.625	
Clamp shaft nut locking pin.	Through clamp nut and shaft.	.....do.....	1			
Clamp shaft nut washer.	On clamp shaft.....	Bronze.....	1			
Clamp shaft handle.....	.....do.....	.....do.....	1			
Clamp shaft handle set-screw.	Through clamp handle and shaft.	Steel.....	1	.25	.75	Length over all.
Clamp shaft bushing.	On clamp shaft.....	Bronze.....	1			
Clamp shaft bushing screws.	Through bushing and frame.	Steel.....	3	.25	.75	Do.
Clamp guide pins.....	Through clamp and clamp guide pin bracket.	.....do.....	2	.625	1.375	Length over all; diameter of pin.
Clamp guide pin brackets.	Bolted to front transom frame.	.....do.....	2			
Clamp guide pin bracket bolts.	On clamp guide pin brackets.	.....do.....	2			
Clamp separator.....	On clamp pivot bolt.....	Bronze.....	1			
Clamp pivot bolt.....	Through clamps and pivot-bolt bracket.	Steel.....	1	.5	4.375	Diameter of pin; length over all.
Clamp pivot bolt split pin.	Through pivot bolt.....	.....do.....	1			
Clamp pivot bolt bracket.	Bolted to front transom of frame and pintle fork.	.....do.....	2			
Clamp pivot bolt bracket nuts.	On pivot bolt bracket.....	.....do.....	2			
Eye bolts.....	Part of frame.....	Cast steel.....	2			
Elevating arc.....	On mortar.....	Steel.....	1			
Elevating arc bolts.....	Through elevating arc and mortar.	.....do.....	4	.625	2	Diameter of thread; length over all.
Elevating arc bolt washer.	On elevating arc bolt.....	.....do.....	4			
Frame.....		Cast steel.....	1			
Frame separator.....	Between cheeks of frame.	Gas pipe.....	1			
Frame separator bolt.	.....do.....	Steel.....	1	.75	13.375	Length over all.
Frame separator bolt nut.	On damp separator bolt.	.....do.....	1			
Frame, right cheek.....	Part of frame.....	Cast steel.....	1			
Frame, left cheek.....	.....do.....	.....do.....	1			
Frame, front transom.....	.....do.....	.....do.....	1			
Frame, rear transom.....	.....do.....	.....do.....	1			
Pintle fork.....	Bolted to front transom of frame.	Steel.....	1			
Pintle fork bolt.....	Through front transom and pintle fork.	.....do.....	1	.75	2.67	Do.
Pintle fork bolt nut.....	On pintle fork bolt.....	.....do.....	1			
Pointing screws.....	Screwed to rear of cheeks of frame.	.....do.....	2			
Toggles.....	Attached to toggle brackets.	.....do.....	2			
Toggle pins.....	Through toggle and toggle bracket.	.....do.....	2	.5	1.75	Do.
Toggle pin split pin.....	Through toggle pins.....	.....do.....	2			
Toggle brackets.....	On frame.....	.....do.....	2			
Toggle bracket bolts.	Through frame and brackets.	.....do.....	2	.5	1 1/4	Do.

3.6-INCH B. L. MORTAR CARRIAGE PLATFORM.*List of parts and materials, with correct nomenclature, etc.*

Name of part.	Location.	Material.	Number.	Diameter.	Length.	Remarks.
				Inch.	Inch.	
Anchor block.....	Bolted to rear of platform.	Yellow pine or oak.	1			
Anchor-block bolts..	Through anchor block and platform.	Wrought iron.....	3	0.75	7.25	Length over all.
Anchor-block bolt nuts.	On anchor block bolts..	.....do.....	3			
Anchor-block bolt washers.	.....do.....	.....do.....	3	2		Outside diameter.
Anchor stake.....	In ground in front of platform.	Wood.....	1	4	48	Length over all.
Anchor-stake band..	On head of anchor stake.	Wrought iron.....	1	3		Insidediameter.
Anchor-stake pins..	Through anchor stake..	Wood.....	2	1.25	8	
Deck planks.....	Part of platform.....	Yellow pine or oak.	11		22	
Deck-plank rivets....	Through deck planks and side pieces.	Wrought iron.....	16			
Deck-plank rivet washers.	On deck-plank rivets..	.....do.....	16			
Deck-plank dowels..	Connecting deck planks.	Wood.....	15			
Pintle block.....	Bolted to platform.	Cast iron.....	1	2	3	Diameter of pintle, length over all.
Pintle-block bolts....	Through pintle block and platform.	Wrought iron.....	4	.5	4.37	Length over all.
Pintle-block bolt nuts.	On pintle-block bolts..	.....do.....	4			
Pintle-block bolt washers.	.....do.....	.....do.....	4			
Platform stakes.....	In ground about platform.	Wood.....	8			Dimensions, 2 by 3 by 45 inches.
Platform-stake loops.	Attached to front of platform by loop straps.	Wrought iron.....	2			
Platform-stake loop straps.	Attached to front of platform.	.....do.....	2			
Platform-stake loop-strap bolts.	Through loop straps and platform.	.....do.....	4			
Platform-stake loop-strap bolt nuts.	On loop-strap bolts.....	.....do.....	4			
Platform-stake loop-strap bolt washers.	.....do.....	.....do.....	4			
Scale socket.....	Set in platform.	Brass.....	1			
Side pieces.....	Part of platform.....	Yellow pine or oak.	2			
Side-piece straps.....	.....do.....	Wrought iron.....	4			
Side-piece strap rivets.	Through straps, side pieces, and deck plank.	.....do.....	8			

With each platform there is also furnished one recoil rope complete.

Price of carriage and platform, \$300.

SPARE PARTS FOR 3.6-INCH B. L. MORTAR.

The following spare parts of 3.6-inch B. L. mortar will be issued. Those to be carried with equipment of battery and quantities of each have not been determined.

Parts.	Price each.	Parts.	Price each.
Vent covers.....	\$3.25	Retracting studs.....	\$1.50
Locking bolts.....	3.00	Hinge springs.....	2.00
Locking-bolt handle.....	2.50	Hinge-pin screws.....	.50
Locking-bolt handle pins.....	.25	Block stops.....	1.50
Carrier-latch covers.....	4.00	Obturator spline screws.....	.25
Carrier-latch covers screws.....	1.00	Obturator nuts.....	2.50
Carrier latch or bolt.....	1.75	Obturator springs.....	2.50
Carrier-latch springs.....	.25		

SPARE PARTS FOR 3.6-INCH B. L. MORTAR CARRIAGE AND PLATFORM.

The following spare parts of carriage and platform will be issued to be carried with equipment:

Parts.	Price.
1 anchor stake (complete)	\$0.85
8 platform stakes .....	.19
1 recoil rope (complete) .....	.50

Contents of steel armament chest for 3.6-inch B. L. mortar, model 1890, and 3.6-inch B. L. mortar carriage, model —.

Parts.	Price each.
1 boiler maker's hammer	\$1.00
1 pointing scale	6.75
1 screw wrench, 12-inch .....	.55
1 vaseline can, 4-gallon	1.30
1 sperm-oil can, 4-gallon	1.75
1 gunner's quadrant, model 1898	16.00
1 gunner's gimlet .....	.24
1 gunner's reamer .....	.50
1 priming wire .....	.50
1 vent punch	1.87
1 oiler, 4-pint .....	.25
1 file, flat, dead smooth, 8-inch .....	.30
1 file, half round, smooth, 8-inch .....	.15
1 file, round, second cut, 8-inch .....	.12
1 screw-driver, 10-inch (for small screws)	1.10
1 screw-driver, double ended, 10-inch (for large screws)	1.84
1 obturator-nut wrench .....	.30
1 pin wrench .....	.75
1 copper drift, small .....	.75
1 copper drift, large .....	.25
1 cold chisel, 4-inch .....	.10
1 vaseline (cosmetic) brush .....	.60
1 pair cutting pliers	3.50
1 cartridge pouch	
1 pound copper wire, No. 16	1.59
1 primer pouch .....	.67
6 silk wipers .....	.33
1 rope sling .....	.81
1 lanyard .....	.29
4 quire emery cloth, No. 00 .....	.50
2 wagon sponges	
2 balls of twine	40.00
1 tool chest	

The following additional implements and equipments not contained in armament chest are furnished with each 3.6-inch B. L. mortar:

Parts.	Price.
1 breech cover	\$1.09
1 combined tampon and muzzle cover	2.00
1 maneuvering handspike .....	.80
1 maul .....	.75
1 paulin, 6 by 8 feet	4.23
1 sponge cover .....	.19
1 sponge and rammer combined	1.25

The complete equipment of the 3.6 inch B. L. mortar comprises the gun, carriage, platform, implements, and tools; all to be transported in the ordinary army wagon, or in the platform wagon for siege batteries furnished by the Ordnance Department.

In garrison service or in field emplacements, when the mortar is not in use, the recoil-check rope will be wound about the carriage, the combined sponge and rammer, the maneuvering handspikes, and mauls placed along the sides, and the whole covered by the paulin for weather protection.

1.65-INCH B. L. HOTCHKISS MOUNTAIN GUN.

WEIGHT, DIMENSIONS, ETC., OF 1.65-INCH HOTCHKISS B. L. MOUNTAIN GUN AND AMMUNITION.

Weight, 121 pounds.
Total length, 3.83 feet.
Length of bore, 25.0 calibers.
Maximum diameter, breech, 5.03 inches.
Diameter of muzzle, 2.55 inches.
Diameter of trunnions, 1.8 inches.
Length of trunnions, 1.8 inches.
Distance between rim bases, 4.7 inches.
Distance of axis of trunnions from muzzle, 27.3 inches.
Powder chamber:
 Diameter, 1.8 inches.
 Length, 4.6 inches.
 Capacity, 11.71 cubic inches.
Travel of projectile in bore, 22.5454 calibers, 37.2 inches.
Projectile:

Kind.	C. I. shell, fixed.	Case, fixed.
Weight (filled).....pounds..	2	2
Ratio of weight to weight of piece.....	1.7 ¹ / ₂	1
Weight of bursting charge, rifle powder.....ounces..	3.5	1
Length.....calibers..	.91	1
Sectional density.....	\$1.50	\$1.
Price ^a		

^a Complete cartridges fixed ammunition.

Powder:

Kind, black (mortar) and smokeless.
Weight (ounces), black (mortar), 5.5; smokeless, 2¹/₄.
Density of loading, 0.8127.

Muzzle velocity:

Black, 1,460 foot-seconds.
Smokeless, 1,313 foot-seconds.

Maximum pressure per square inch:

Black, 13,340 pounds.
Smokeless, 13,000 pounds.

Penetration in steel at (De Morre formula, normal impact):

Muzzle—
 Black, 1.6 inches.
 Smokeless, 1.3 inches.

Muzzle energy:

Black, 29.6 foot-tons.
Smokeless, 23.9 foot-tons.

Rifling—

Number of grooves, 10.
Width of grooves, 0.36 inch.
Depth of grooves, 0.012 inch.
Width of lands, 0.157 inch.
Twist of rifling, 1 in 29.83 calibers.

1.65-INCH B. L. MOUNTAIN GUN.

Includes gun proper, breech mechanism, and sights, as per list below (price of gun \$225):

BREECH MECHANISM.

The breech mechanism of all the 1.65 inch breech loading mountain guns have been changed to a percussion firing mechanism.

There are two models of these guns, the Paris model and the American Ordnance Company model.

The principal parts and nomenclature of the breech mechanism of the Paris model are :

Breechblock.	Handle-stop screw.
Guide groove.	Locking screw.
Extractor-cam slot.	Locking-screw pin.
Stop-bolt groove.	Mainspring.
Loading hole.	Sear.
Cocking cam.	Sear cap.
Cocking lever.	Sear spring.
Cocking-lever pallet.	Sear housing.
Extractor.	Stop bolt.
Claw.	Sight, front.
Lug.	Sight, rear.
Face plate.	Sight bar.
Firing pin.	Sight-bar clamp screw.
Handle.	Drift slide.
Locking plate.	Drift-slide clamp screw.
Locking shoulder.	
Handle stop.	

The firing pins and mainsprings are interchangeable, and may be used with any gun of the Paris model. None of the other parts of the breech mechanism are interchangeable, and each must be used with the gun to which it has been fitted. Each part is numbered to correspond with the gun to which it belongs. Requisitions for parts should therefor state for what number of gun the parts are required.

In the older type of this gun there is no firing mechanism; but in place of it a vent is pierced at an angle through the breechblock to the hole in the face plate. At present, guns having the firing mechanism are also provided with the vent, so that resort may be had to either system.

The principal parts and their nomenclature of the breech mechanism of the American Ordnance Company model are as follows:

Breechblock.	Handle.
Extractor-cam slot.	Locking plate.
Guide groove.	Locking shoulder.
Loading hole.	Handle stop.
Stop-bolt groove.	Handle-stop screw.
Extractor.	Locking screw.
Claw.	Cocking cam.
Lug.	Mainspring.
Face plate.	Sight, front.
Firing pin.	Sight, rear.
Hammer.	Drift slide.
Cocking tooth.	Drift-slide clamp screw.

Sight, rear—Continued.
 Sight bar.
 Sight-bar clamp screw.
 Spring box.
 Stop bolt.

Trigger piece.
 Bayonet joint.
 Sear.
 Trigger toe.
 Vent bushing.

The breechblock, the locking screw, the handle, and the extractor are similar to the corresponding parts of the Paris model, and the method of operating the breech mechanism is the same as that of the Paris model. The firing mechanism, however, is entirely different.

The parts of the breech mechanism of this model of gun are not interchangeable with each other or the Paris model, neither the front sights. Therefore requisitions should state clearly for what model and number of gun the parts asked for are required.

REAR SIGHT.

The rear sight is a scale of tangents consisting of a vertical bar graduated in degrees, carrying a sliding leaf graduated for correcting for drift or wind. The sight slides through a socket, is fixed in position by a clamp screw, and only mounted on gun when in action. When not in use it should always be kept in gunner's haversack.

For further description of sights see "Handbook of Sights for Cannon," published by Ordnance Department.

FUSEE.

The fuses used with the projectiles for the 1.65-inch mountain guns are:

High resistance point percussion fuse, 1.65-inch, model 1900, F. A.

CLEANING MATERIAL.

For allowance of cleaning material, etc., per annum, see "supply table," page 549-551.

SPARE PARTS OF GUN.

The following spare parts are issued for 1.65-inch B. L. mountain gun:

SPARE PARTS AND ACCESSORIES.

The following spare parts and accessories are issued with each gun of the Paris model:

	Price each.		Price each.
Spare parts (Plate II):		Accessories (Plate V)—Continued.	
1 extractor	\$4.00	1 breech sight	\$12.50
2 firing pins	2.75	1 cleaning brush .....	.50
2 mainsprings .....	.50	1 lanyard .....	.50
1 stop bolt	6.50	1 tompon (on gun)	1.50
Accessories (Plate V):		1 breech cover (on gun)	4.50
1 hand extractor	1.00	1 sponge brush and rod	7.50
1 face-plate wrench	2.00	1 gunner's haversack	2.00
1 screw-driver .....	.75	1 cutting pliers .....	.50
1 dismounting pin .....	.75	1 vent cleaner	1.50
1 oil can .....	.90		

The following spare parts and accessories are issued with each gun of the American Ordnance Company model:

Spare parts (Plate IV):	Price each.	Accessories (Plate V)—Continued.	Price each.
1 vent bushing		1 oil can	\$0.90
2 mainsprings	\$0.75	1 cleaning brush .....	.50
2 firing pins .....	.75	1 lanyard .....	.50
1 extractor	14.50	1 tomplon (on gun)	1.00
1 stop bolt		1 breech cover (on gun)	4.25
Accessories (Plate V):		1 sponge brush and rod	7.00
1 hand extractor	1.00	1 breech sight	12.00
1 face-plate wrench	2.00	1 gunner's haversack	2.68
1 screw-driver .....	.75	1 cutting pliers .....	.50
1 breech-mechanism tool	1.75	1 vent cleaner	1.75
1 dismounting pin .....	.75		

A set of spare parts, as enumerated, should always be kept on hand with organization or at post keeping guns of this kind on hand.

AMMUNITION.

The ammunition for the 1.65-inch B. L. mountain gun is fixed ammunition, brass cartridge case, loaded with either cast-iron (common) shell or canister.

1.65-INCH B. L. MOUNTAIN GUN.

CARRIAGE.

The 1.65-inch mountain-gun carriage is composed of the following principal parts:

	Price.
2 wheels	\$22.72
Nave boxes	
Nave-box bolts	
Nave-bolt nuts	
Nave-box bolt washers	
Spokes	
Fellies	
Tire bolts	
Tire-bolt nuts	
Tire-bolt washers	
Dowels	
2 bricole swivels	
2 1/2-inch pins	
2 1/2-inch-pin washers	
1 axle, steel	
2 axle clamps	
4 axle-clamp screws	
Trail—	
Flank	
Lunette	
Hook for splinter bar	
Elevating-screw bearing	
Elevating screw	
Elevating-screw handle	
Front transom	
Rear transom	
Cap square	
Cap-square bolts	
Cap-square bolt nuts	
1 sponge rod front support	
1 sponge rod rear support	
Price of carriage complete	150.00

Weights and measurements of gun.

Caliber of gun.....	inches.....	1.65
Total length of gun.....	do.....	46.1
Length of bore.....	calibers.....	25
Pitch of rifling.....	degrees.....	8° 17'
Number of grooves.....	.....	10
Length of line of sight.....	inches.....	17.9
Total weight of gun.....	pounds.....	121

Weight of pack saddle.

Weight of pack saddle and harness for gun.....	pounds.....	65
Total load of gun mule (including saddle).....	do.....	227
Weight of pack saddle and harness for carriage mule.....	do.....	65
Total load of carriage mule (including saddle).....	do.....	288
Weight of pack saddle and harness of ammunition mule.....	do.....	57
Total load of ammunition mule with 56 rounds of ammunition (including saddle).....	pounds.....	277

Principal weights, etc., of carriage.

Length of carriage body.....	55.1 inches.
Weight of carriage body with sponge and rods.....	97 pounds.
Weight of two wheels.....	123 pounds.
Height of trunnion centers above ground.....	27.9 inches.
Diameter of wheels.....	27.4 inches.
Length of axle.....	38.2 inches.
Total weight of gun carriage complete.....	341 pounds.
Vertical field of fire:	
Elevation.....	15 degrees.
Depression.....	5 degrees.

A brake rope has been added to the equipment of the carriage of the 1.65-inch mountain gun. The trail of this carriage not being provided with a brake-rope hook, and the addition of brake rope to its equipment being of recent adoption, the hook for shaft or pole on the lunette of trail of this carriage will be utilized as a brake-rope hook in attaching the brake rope.

A complete battery of the 1.65-inch mountain gun, when equipped as such, will be of the same composition as that provided for the 2.95-inch mountain gun. (See page 549, etc.)

RELOADING TOOLS FOR 1.65-INCH HOTCHKISS MOUNTAIN GUN.

The component parts of a set of reloading tools for 1.65-inch Hotchkiss mountain gun are as follows:

Part.	Price
Loading and neck resizing press.....
Loading sleeve.....
Common shell plunger.....
Case ejector.....
Cartridge ejector.....	15 degrees.
Case ejector.....
Neck resizing die.....
Screw end cap for resizing.....
Venting punch.....
Fuse wrench.....
Fuse-seat wiping brush.....
Shell charger.....
Cartridge-case charger.....
Shell funnel.....
Cartridge-case funnel.....
Total.....	\$41.00

Reloading tools are not issued to the service.

Sets of these tools made by the Hotchkiss Company differ from the sets made at Frankford Arsenal in that the loading press has a resizing attachment with the following additional implements: Case ejector, neck resizing die, screw end cap for resizing, and venting punch.

The Hotchkiss tools can not be used for Frankford Arsenal ammunition, but the Frankford Arsenal tools can be used for both.

For complete instructions for reloading this ammunition, see pamphlet "Reloading tools for 1.65-inch Hotchkiss mountain gun," published by Ordnance Department.

PACK OUTFITS FOR 1.65-INCH B. L. HOTCHKISS MOUNTAIN GUN.

Pack saddles should be carried on property returns as so many *pack saddles*, and not as "sets" or "pack outfits," and the harness as "harness for Hotchkiss pack outfit," sets of.

The component parts of pack saddles, harness, etc., for 1.65-inch B. L. mountain guns are as follows:

Component parts, material, etc., of pack saddles, harness, etc., for 1.65-inch B. L. mountain gun.

Name of parts.	Number.	Weight.	Length.			Buckles.		Material.	Price each.
			Cut.	Fin-ished.	Width.	Number.	Width.		
<i>Pack saddle for gun and wheels.</i>									
<i>Saddle:</i>		<i>Lbs.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>		<i>In.</i>		
Metal yokes, japanned...	2	5½						Gun metal.....	\$34.22
Metal trunnion plates.....	2	½						do.....	
Side pieces for trunnion plates, japanned.....	2		20					¼-inch thick steel.....	
Springs for pads, front.....	2		13½	13½	½			do.....	
Springs for pads, rear.....	2		10½	10½	1			do.....	
Iron rivets, flat head.....	22		3					¼-inch iron, round.....	
Iron rivets, round head.....	8		1					do.....	
Saddle bars.....	2		24	28	7			8-inch poplar.....	
Cross pieces.....	2		22	21	1½			1-inch ash.....	
Saddle pads.....	2		46	25	25			No. 1 cotton duck.....	
Tow.....		18							
Skirts..... pair.....	1		17½	17½	25½			Harness leather.....	3.69
Under cover.....do.....	1		10½	10½	25			do.....	
Facings on front.....	2		41½	41½	3			do.....	
Facings on rear.....	2		46	46	4			do.....	
Facings on top.....	2		25½	25	3			do.....	
Sockets.....	4		6½		6			Collar leather.....	
Sockets, reinforce.....	4		5½		4½			do.....	
Lacings.....	4		72	72	½			Lace leather.....	
Saddle cincha (complete).....	1		65	64	22			No. 1 cotton duck.....	
Latigo strap.....	1		90	87	1½			Harness leather.....	
Circular piece, ¼-inch diameter.....	1							do.....	
Chapes.....	2		8½	4½	10			do.....	
Lacings.....	1		18	18	½			Lace leather.....	
Metal frames.....	2	1						Gun metal.....	8.78
Cargo cincha (complete).....	1		59½	58½	22			No. 1 cotton duck.....	
Latigo straps.....	2		88	85	2			Harness leather.....	
Pads.....	4		16½	10	9½			Collar leather.....	
Slot lining.....	2		8	8	4			do.....	
Facings and chapes.....	1		67	59	10			Harness leather.....	
Metal frames.....	2	1½						Gun metal.....	
Blocks.....	1		10	10	2½			1-inch thick poplar.....	
Belly cincha (complete).....	1		20	19	22½			No. 1 cotton duck.....	
Chapes.....	2		9½	4½	5½			Harness leather.....	
Billets for securing wheels.....	4		36	36	1½	4	1½	do.....	4.65
Chapes for securing wheels.....	4		10½	8	1½			do.....	
O-rings.....	2		18					¼-inch iron, round.....	
Side piece for crupper.....	2		28	23	11½			Collar leather.....	
Linings for crupper.....	2		22	21½	12½			do.....	
Reinforce for crupper.....	2		11½	11½	2			Harness leather.....	
Docks for crupper.....	1		10½	10½	7½			do.....	
Facings for crupper.....	2		72	72	½			Lace leather.....	

Component parts, material, etc., of pack saddles, harness, etc., for 1.65-inch B. L. mountain gun—Continued.

Name of parts.	Number.	Weight.	Length.		Width.	Buckles.		Material.	Price.
			Cut.	Fin- ished.		Number.	Width.		
Pack saddle for gun and wheels—Continued.									
Saddle—Continued.		Lbs.	In.	In.	In.	In.	In.		
Straps for securing wheels.	1	20½	18		1	1	1½	Harness leather	\$ 0
Hub straps, body.	1	31	22½		1½	1		do	
Hub straps, billet.	1	31	20		1½			do	
Lashing rope.	1	240	240					½-inch manila rope.	
Top for gun pad.	1	25			8			Collar leather	
Sides for gun pad.	2	10½			5½			do	
Bottoms for gun pads.	1	19			8			do	
Tow.	2	2							
Saddle for gun, complete.									\$ 7
Pack saddle for carriage.									
Saddle:									
Metal yokes, japanned.	2	6½						Gun metal.	
Springs for pads, front.	2		13½	13½	1			½-inch thick steel	
Springs for pads, rear.	2		10½	10½	1			do	
Iron rivets, flat head.	22		3					½-inch iron, round.	
Saddle bars.	2		24	23	7			½-inch poplar.	
Cross pieces.	2		22	21	1½			1-inch ash.	
Straps for securing harness.	2		42	40	2	2		Harness leather.	
Straps for securing pole and splinter bar, front.	1		41	39	1	1	1	do	
Straps for securing pole and splinter bar, rear.	1		45	43	1	1	1	do	
Saddle pads.	2		46	23	25			No. 1 cotton duck.	\$ 3
Tow.	1	18							
Skirts, pairs.	1		17½	17½	25½			Harness leather.	
Under covers, do.	1		10½	10½	25			do	
Facings on front.	2		41½	41½	3			do	
Facings on rear.	2		46	46	4			do	
Facings on top.	2		25½	25	3			do	
Sockets.	4		6½		6			Collar leather.	
Sockets, reinforce.	4		5½		4½			do	
Lacings.	4		72	72	1			Lace leather.	
Saddle cincha (complete).	1		65	64	22			No. 1 cotton duck.	
Latigo strap.	1		90	87	1½			Harness leather.	
Circular pieces, ½ inch di- ameter.	1							do	
Chapes.	2		8½	4½	10			do	
Lacings.	1		18	18	½			Lace leather.	
Metal frames.	2	1						Gun metal.	
Cargo cincha (complete).	1		52	51	22			No. 1 cotton duck.	
Latigo straps.	2		88	85	2			Harness leather.	
Chapes.	2		8½	4½	10			do	
Facings.	1		13	13	10			Collar leather.	
Slot lining.	1		12½		3½			do	
Metal frames.	2	1½						Gun metal.	
Elevating screw block.	1		8		10			6-inch thick pine.	
Belly cincha (complete).	1		20	19	22½			No. 1 cotton duck.	
Chapes.	2		9½	4½	5½			Harness leather.	
O-rings.	2		18					½-inch round iron.	
Side pieces for crupper.	2		23	23	11½			Collar leather.	
Linings for crupper.	2		22	21½	12½			do	
Reinforce for crupper.	2		11½	11½	2			Harness leather.	
Docks for crupper.	1		10½	10½	7½			do	
Lacings for crupper.	2		72	72	1½			Lace leather.	
Trail strap.	1		16	14	1½	1	1½	Harness leather.	
Lashing rope.	1		240	240				½-inch manila rope.	
Saddle for carriage complete.									\$ 11
One pack saddle for ammu- nition.									
Saddle:									
Metal yokes, japanned.	2	2½						Gun metal.	
Springs for pads, front.	2		13½	13½	1			½-inch steel.	
Springs for pads, rear.	2		10½	10½	1			do	
Springs for ammunition boxes, japanned.	2		76	76	1½			do	
Clips for ammunition boxes, japanned.	8		4		1½			do	
Do.	2		2	2	1½			do	
Do.	1		8	8	1½			do	
Iron rivets, flat head.	22		3					½-inch iron, round.	

*Component parts, material, etc., of pack saddles, harness, etc., for 1.65-inch B. L.
mountain gun—Continued.*

Name of parts.	Number.	Weight.	Length.			Buckles.		Material.	Price each.
			Cut.	Fin- ished.	Width.	Number.	Width.		
<i>One pack saddle for ammunition—Continued.</i>									
Saddle—Continued.		Lbs.	In.	In.	In.		In.		
Metal wedge reata	4	1						Gun metal	
Round-head bolts	2		1½					½-inch iron, round	
Straps for ammunition boxes.	4		28	26½	1	4	1	Harness leather	
Billets for ammunition boxes.	4		16	16	1			do	\$40.01
Buckle pieces for ammunition boxes.	4		13½	11½	1	4	1	do	
Saddle pads	2		46	28	25			No. 1 cotton duck	
Tow		18							
Skirts	1		17½	17½	25½			Harness leather	
Under covers	1		10½	10½	25			do	
Facings on front	2		41½	41½	3			do	
Facings on rear	2		46	46	4			do	
Facings on top.	2		25½	25	3			do	
Sockets	4		6½		6			Collar leather	
Sockets, reinforce	4		6½		4½			do	
Lacings	4		65	64	22			Lace leather	
Saddle cincha (complete)	1		90	87	1½			No. 1 cotton duck	3.69
Latigo strap	1							Harness leather	
Circular pieces, ½-inch diameter.	1							do	
Chapes	2		8½	4½	10			do	
Lacings	1		18	18	½			Lace leather	
Metal frames	2	1						Gun metal	
Cargo cincha (complete)	1		68	67	22			No. 1 cotton duck	3.73
Latigo straps	2		88	85	2			Harness leather	
Chapes	2		8½	4½	10			do	
Metal frames	2	1½						Gun metal	
Belly cincha (complete)	1		20	19	22½			No. 1 cotton duck	3.45
Chapes	2		9½	4½	5½			Harness leather	
O-rings	2		13					½-inch iron, round	
Side pieces for crupper	2		23	23	11½			Collar leather	
Linings for crupper	2		22	21½	12½			do	
Reinforce for crupper	2		11½	11½	2			Harness leather	3.90
Docks for crupper	1		10½	10½	7½			do	
Lacings for crupper	2		72	72	½			Lace leather	
Lashing rope	1		240	240				½-inch manila rope	.28
Saddle for ammunition, complete.									55.01
<i>One set double harness.</i>									
Bridle, complete (2)									1.90
Crown pieces	2		23	23	1½			Harness leather	
Cheeks	4		27	17½	½	4	½	do	
Throat latches	2		21	17	½	2	½	do	
Brow bands	2		21	15½	½			do	
Reins	4		60	60	½	4	½	do	
Bits	2							Malleable iron	
Rein billets	4		12	12	½			Harness leather	
Breast collars, complete (2)									2.60
Bodies	2		60	60	1½	4	1½	do	
Lays	4		10	10	1			do	
Chapes	4		10	6	1½			do	
Tugs	8		10½	4	½	8	½	do	
Shoulder pieces	2		38	38	2½			do	
Neck-piece chapes	4		20½	17	½	4	½	do	
Neck-piece billets	2		12	12	1½			do	
Collar straps	2		16½	14	½			do	
Back straps	2		40	40	1			do	
Traces	4		66	66	1½			do	
Trace clips	4		8					½-inch iron, round	
Breeching, complete (2)									3.50
Bodies	2		34½	34½	1½			Harness leather	
Lays	4		13½	10½	1½			do	
Side straps	4		77½	62	1	4	1	do	
Hip straps	4		24	21½	1½			do	
Tugs	8		13	5½	½	8	½	do	
Tug safes	8							do	
Back-strap tugs	2		6½	2½	1	2	1	do	
Back-strap tug safes	2							do	
Hooks	4		10					½-inch iron, round	

Component parts, material, etc., of pack saddles, harness, etc., for 1.65-inch B. I. mountain gun—Continued.

Name of parts.	Number.	Weight.	Length.		Width.	Buckles.		Material.	Price each.
			Cut.	Finished.		Number.	Width.		
One set double harness—Cont'd.									
Martingale, complete (2)	2								
Bodies	2		48	87	1	2	1	Harness leather	\$ 75
Saddles	2		6	6	1			do	
Chapes	2		3	2	1	2	1	do	
O-rings, blued	2		7					do	
Pole straps: Bodies (2)	2		31	28	1	2	1	Harness leather	1.50
Traces (2 pairs)	2							Harness leather	1.50
Harness sack, complete	1		46	45	8			No. 8 cotton duck	1.50
Body	1		17	16	1			do	
Sides	2		7	7	1			Collar leather	1.50
Billets	2		3	2	1	2	1	do	
Chapes	2								
Harness, complete, without sack									20.00
One carriage pack.									
Bodies	2		12	12	7			Collar leather	
Connecting piece	1		20	20	7			do	
Carrier-strap chape	1		9	7	1	1	1	do	
Carrier-strap billet	1		11	11	1			do	
Carriage loops	2		16	16	1			do	
Block cover	2		13	13	1			do	
Block	2		7	7	2			1 1/2-inch thick poplar	2.50
Carriage pack, complete									
One neck yoke.									
Main part	1		39	39	2			2-inch thick hickory	75
Brace	1		12	5	3			Harness leather	1.50
Brace billet	1		9	9	1			do	
Staples	2		6					1-inch iron, round	11
Neck yoke, complete									1.50
One pole.									
Main part	1		76	76	3			3-inch thick hickory	
Loop for attaching to carriage	1		18		1			1-inch iron	
Pin tie pin	1		5	5				1 1/2-inch thick iron	
Key	1		5		1			1-inch thick iron	
Iron chain	1		18		1			1-inch iron	
Staples	1		3					do	
Stop for neck yoke	1		8					1-inch iron	
Iron sleeve for joint	2		5		4			1-inch thick iron	
Link for joining ends	1		5		2			1-inch thick iron	
Rivets for joining link	2		2					1-inch iron	
Sleeve for slipping	1		9		6			1-inch thick iron	
Chape	1		4	2	1	1	1	Collar leather	
Pole, complete									20.00
One splinter bar.									
Main part	1		57		1			2 1/2-inch thick hickory	
Band and hook for attachment	2		8		1			1-inch thick iron	
Rivets	6		1					1-inch iron, round	
Bands for carriage attachment	2		6		1			1-inch thick iron	
Bands for trace attachment	4		5		1			1-inch thick iron	
Do.	4		7					1-inch iron, round	
Splinter bar complete									
Four ammunition boxes.									
Wood parts	8		24		8			1-inch thick white pine	
Do.	8		24		7			do	
Do.	8		7		7			do	
Do.	16		7		6			do	
Do.	4		7		6			1-inch thick white pine	
Handles	8		9		1			1-inch thick iron	
Cover fastenings	8		12					No. 6 wire	
Do.	8		11					do	
Springs	8		12		1			No. 24 sheet brass	
Safety hinges	8		2		1			No. 16 steel wire	
Ammunition box complete, each.									3.25

Blinders for army mules, one with each saddle, \$2.65 each.

Any of the parts of Hotchkiss mountain pack needed for repairs will be furnished upon requisition. In making requisition for such parts the nomenclature given in this manual should be followed.

HOTCHKISS 3-INCH B. L. MOUNTAIN GUN.

(Price of gun, \$——.)

Weight, Dimensions, etc., of 3-inch Hotchkiss B. L. Mountain Gun and Ammunition.

Weight, 216 pounds.
 Total length, 3.76 feet.
 Length of bore, 13 calibers.
 Maximum diameter, breech, 6.7 inches.
 Diameter of muzzle, 3.94 inches.
 Diameter of trunnions, 2.56 inches.
 Length of trunnions, 2.44 inches.
 Distance between rim bases, 7.09 inches.
 Distance of axis of trunnions from muzzle, 26.5 inches.
 Powder chamber:
 Diameter, 3.16 inches.
 Length, 3.72 inches.
 Capacity, 27.12 cubic inches.
 Travel of projectile in bore, —— caliber, 36.2 inches.
 Projectile:

Kind.	C. I. shell, fixed.	Shrapnel, fixed.	Case, fixed.
Weight (filled) pounds..	12	12	12
Ratio of weight to weight of piece	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
Weight of bursting charge, rifle powder, ounces..	6.3	1.9	—
Length calibers..	8.5	—	—
Sectional density ——	1.70	1.70	1.70
Price.....	\$4.60	\$7.80	\$2.15

^a Complete cartridges, fixed ammunition.

Powder:

Kind, black (I. K. granulated) and smokeless.
 Weight, black (I. K. granulated), 14 ounces; smokeless, $4\frac{1}{2}$ ounces.
 Density of loading, black (I. K. granulated), 0.9; smokeless, 0.2870.

Muzzle velocity:

Black, 870 feet-seconds.
 Smokeless, 885 feet-seconds.

Maximum pressure per square inch:

Black, 15,000 pounds.
 Smokeless, 13,500 pounds.

Penetration in steel at (De Morro formula, normal impact):

Muzzle—
 Black, 1.4 inches.
 Smokeless, 1.5 inches.

Muzzle energy:

Black, 63 foot-tons.
 Smokeless, 65.2 foot-tons.

Rifling:

Number of grooves, 24.
 Width of grooves, 0.276 inch.
 Depth of grooves, 0.026 inch.
 Width of lands, 0.117 inch.
 Twist of rifling, 1 in 25.59 calibers.

Six of the guns of this caliber and kind, of the total of ten in the service, were for friction firing and have been altered for percussion firing.

The breech and firing mechanism of these guns consists of the following principal parts:

Breech block.	Main spring.
Stop bolt.	Firing point.
Stop pin.	Locking washer.
Locking screw.	Operating lever.
Sear.	Extractor.
Sear box.	Face plate.
Hammer.	Lanyard hook.

The parts of the breech mechanism of these guns for percussion firing are not interchangeable. Therefore in making requisitions for any of these parts requisition must state the number of the gun for which the parts are required.

SIGHTS.

Front sight.—The front sight for the 3-inch breech-loading Hotchkiss mountain gun is of the open type and made of cast steel with two branches formed on the arc of a circle, coming nearer together at the top of the sight. For rapid sighting the whole circle can be used, and for close work the space between the two points becomes the front sight. This sight is screwed into the trunnion band of the carriage.

Rear sight.—The rear sight consists of a vertical bar of triangular cross section, graduated in millimeters on one face and in ranges on the other. The sight is placed in its socket, which is a vertical hole through the left side of the breech of the gun, and is composed of the following principal parts:

- Vertical limb.
- Deflection slide.
- Clamp.

The deflection slide is provided with an open sight for rough and a peep sight for fine sighting.

AMMUNITION.

The ammunition used for this gun is fixed ammunition consisting of metallic cartridge case, the charge, and the projectile. The ammunition is of three kinds:

- Cast-iron shell,
- Shrapnel, and
- Cannister.

FUSES.

The fuses used for the ammunition of this gun are of two kinds:

- Point percussion fuse, and the
- Combination time percussion fuse.

The point percussion fuse is similar to the one used in the 1.65-inch gun, description of which will be found on page 346. The combined time and percussion fuse is composed of the following principal parts:

- Safety pin.
- Detonator.
- Time train firing pin.
- Quick train.
- Powder bag.
- Time train.
- Channel.
- Split ring.
- Percussion firing pin.
- Plunger.
- Base plug.

CARRIAGE.

Price of carriage, \$——

The carriage for the 3-inch (12-pounder) breech-loading mountain gun is constructed of steel, and consists of the following principal parts, viz:

- 1 axle (solid steel forging stiffened by reenforced plate elevated to body of carriage).
- 2 wheels complete.
- 2 flasks (trail).
- 1 front transom.
- 1 elevating transom.
- 1 rear transom.
- 2 trunnion bans.
- 2 cap squares.
- 2 cap-square keys and chains.
- 2 axle-reenforcing plates.
- 1 elevating lever.
- 1 elevating crank.
- 1 elevating screw.
- 2 trail handles.
- 1 lunette.
- 1 brake-rope securing hook.
- 1 brake-rope hook.
- 1 sponge-rod rear support.
- 1 sponge-rod front support.

There are furnished with each gun and carriage (all carried on the carriage)—

	Price each.
1 sponge rod	
1 sponge	
1 sponge cover	
2 drag ropes	
1 pair shafts	

For gun:

1 breech cover	
1 muzzle cover	

Also,

1 gunner's haversack, containing—

1 tangent (rear) sight	\$23. 75
1 gunner's quadrant	16. 00
2 lanyards .....	. 81
1 fuse key	
1 front sight (on trunnion band of carriage)	5. 40

1 cannoneer's haversack, containing—

1 spare extractor	
1 spare stop bolt with spring washer	
1 vent cleaner	
1 drift	
1 dismounting pin	
1 oil can	
1 screw-driver	
1 pair cutting pliers	
2 cleaning brushes	
1 fuse wrench	

When the 3-inch Hotchkiss mountain gun is transported by pack animals there should be for each gun:

- 1 gun mule,
- 1 steel shaft and accessory mule,
- 1 carriage mule,

and such number of mules as may be desired for the carrying of ammunition.

The pack saddle utilized for the purpose of transporting this gun, carriage, and its equipment is a saddle similar to the one for the 1.65-inch gun, and the nomenclature of the parts are applicable to it.

EQUIPMENT OF 3-INCH HOTCHKISS MOUNTAIN GUN.

These guns are not part of the adopted equipment for mountain or field batteries of U. S. Army, and the limited number on hand are for issue in emergency only. In the event of such an issue the provisions for the equipment of the batteries made for the 2.95-inch (75 millimeter) mountain gun will apply to the batteries equipped with this gun.

2.95-INCH (75-MILLIMETER) VICKERS-MAXIM MOUNTAIN GUN.

(Adopted type for mountain batteries.)

Includes breech mechanism and firing mechanism as per list below:

Official name of part.	No.	Material.	Location.	Remarks.	Synonym names used in service, shops, etc.
Breechblock	1	Steel ...	In breech	Interchangeable ..	Block.
Threaded sectors	2	.....	Formed on breech-block.	.....
Slotted sectors	2do	Segment.
Gear segment	1	.....	.....	.....
Safety groove	1	.....	.....	.....
Groove in which projection on rear safety arm travels during unlocking.	1	.....	Cut on rear face of breechblock.	.....
Locking-bolt recess	1	Carrier lugs.
Cocking piece	1	Steel ...	Seated in rear end of breechblock.	Interchangeable ..	
Cocking cam	2	.....	Formed on cocking piece.	.....
Cocking-piece screw	1	Steel ...	Secures cocking piece to breechblock.	Interchangeable ..	
Locking bolt	1	.....do ..	Seated in carrier .....	.....do
Locking-bolt spring	1	.....do ..	Secured to locking bolt.	.....do
Locking-bolt-spring rivet.	1	.....do ..	Secures spring to locking bolt.	.....do
Carrier	1	.....do ..	Pivoted to breech by carrier axis pin.	.....do
Locking-bolt recess	1	.....	Cut in front face of carrier.	.....
Hand-lever-latch recess.	1	.....	In lower hand lever axis pin lug.	.....
Carrier-hinge lug	1	Right side of carrier.	Hand-lever level pinion.
Hand-lever axis pin lugs.	2	.....	Formed on rear face of carrier.	.....
Carrier axis pin	1	Steel ...	Pivots carrier to breech of gun.	Interchangeable ..	Retaining lever actuating retaining latch, one piece.
Carrier axis pin split pin.	1	.....do ..	Secures carrier axis pin.	.....do
Hand lever	1	.....do ..	Pivoted to rear face of carrier.	.....do
Pinion	1	.....	.....	Those made at Watervliet Arsenal not interchangeable with those of guns purchased from Vickers Sons & Maxim, Limited.
Handle	1	Steel ...	Formed on opposite ends of hand lever.	Interchangeable.	
Stop	1	.....	On hand lever near the pinion.	.....
Hand-lever axis pin	1	Steel ...	Pivots hand lever to carrier.	.....
Hand-lever axis pin split pin.	1	.....do ..	Secures hand-lever axis pin.	.....do
Hand-lever latch	1do ..	Pivoted in recess in handle.do	

Official name of part.	No.	Material.	Location.	Remarks.	Synonymous names used in service, shops, etc.
Hand-lever latch spring.	1	Steel ...	Attached to hand-lever latch.	Interchangeable.	
Hand-lever latch split pin.	1	...do...	Pivots hand-lever latch to hand lever.	...do...	
Firing pin.	1	...do...	Seated in breechblock.	...do...	
Firing-pin cocking studs.	2	...do...	Formed on firing pin.	...do...	Firing-pin studs.
Firing-pin recocking hook.	1	...do...	...do...	...do...	Firing-pin hook.
Firing-pin bent.	1	...do...	...do...	...do...	Shoulder.
Firing-pin point.	1	Steel ...	Screwed into firing pin	Interchangeable.	
Main spring.	1	...do...	Seated in firing pin	...do...	Firing-pin spring.
Guide plate.	1	...do...	Seated in rear face of carrier; hand-lever axis pin passes through it and secures it.	...do...	
Sear.	1	...do...	Pivoted to carrier by its stud.	...do...	Trigger sear.
Sear stud.	1	...do...	Formed on sear	...do...	Trigger-sear stud.
Sear bent.	1	...do...	...do...	...do...	Trigger-sear bent.
Sear safety arm.	1	...do...	...do...	...do...	Trigger-sear safety arm.
Sear actuating arm.	1	...do...	...do...	...do...	Trigger-sear actuating arm.
Sear spring.	1	...do...	Attached to sear	Interchangeable.	Trigger-sear spring.
Trigger.	1	Steel ...	Fitted in left side of breech of gun.	...do...	Trigger and trigger lever are called firing lever.
Trigger spring.	1	...do...	...do...	...do...	Firing-lever torsion spring.
Trigger lever.	1	...do...	...do...	...do...	
Trigger-lever split pin.	1	...do...	...do...	...do...	
Extractor.	1	...do...	Pivoted in right side of breech.	...do...	
Extractor axis pin.	1	...do...	Pivots extractor to gun	...do...	
Extractor axis-pin split pin.	1	...do...	Secures extractor axis pin.	...do...	

Price of gun, \$843.75.

2.95-INCH (75-MILLIMETER) VICKERS-MAXIM MOUNTAIN GUN.

Principal weights, dimensions, etc.

Weight of gun with mechanism, 236 pounds.

Caliber, 2.953 inches.

Length:

Bore, including chamber, 31.6 inches.

Rifling, 24.33 inches.

Gun over all, 35.85 inches.

Rifling:

Number of grooves, 30.

Width of grooves, 0.23 inch.

Depth of grooves, 0.023 inch.

Twist: Uniform, 1 turn in 25 calibers.

AMMUNITION.

[12.5-pound projectile (British units).]

Muzzle velocity, 920 foot-seconds.

Cartridge case:

Length, 6.25 inches.

Weight, 1.8 pounds.

Ring shell (price, —):

Weight, 12.5 pounds.

Bursting charge, 10 ounces.

Common shell (price, \$4.12 per round):

Weight, 12.5 pounds.

Bursting charge, 10 ounces.

Double common shell (price, \$5.22 per round):

Weight, 18 pounds.

Bursting charge, 13 ounces.

Shrapnel (price, \$9.20 per round):

Weight, 12.5 pounds.

Number of balls, 164.

Weight of balls, 40 to 1 pound.

Bursting charge, 3 ounces.

Case shot (price, \$4.38 per round):

Weight, 15 pounds.

Number of balls, 355.

Weight of balls, about 32 to 1 pound.

Weight of charge (about), 5.25 ounces, cordite; 8 ounces nitrocellulose smokeless powder for 12½-pound projectile, and 7 ounces for 18-pound projectiles.

CARRIAGE

List of principal parts, material, location, etc.

Name of parts.	Location.	Material.	Number.	Diameter.	Length.
				<i>Inches.</i>	<i>Inches.</i>
Arrow plate	Soldered on right side of cradle.	Brass	2		
Axle-lever catch	Screws into handle of axletree lever.	Forged steel No. 0.	1		
Axle-lever-catch spring	Screws into axletree-lever catch.	Spring steel	1		
Axletree	Fits into front crosspiece	Forged steel No. 3.	1		
Axletree lever	Fits into axletree	Forged steel No. 2.	1		
Axletree-lever nut	Screws on end of axletree lever.	Forged steel No. 0.	1		
Bevel wheel	Fits on end of elevating spindle.	Bronze	1		
Brake ropes .....	.....	Manila	2		
Brake rope rings	Attached to end of brake ropes.	Steel	2		
Brake rope hooks	do	do	2		
Bronze end of hand-spike	Bronze inserted on end of hand-spike.	Bronze	1		
Buffer cap	Screwed into front end of recoil cylinder.	Forged steel No. 3.	2		
Buffer cap packing washer	Fitted in front end of recoil cylinder.	Copper or leather.	2		
Buffer shaft	Fits in front crosspiece	Forged steel No. 3.	1		
Buffer shaft washer	Fits on end of buffer shaft	Forged steel No. 2.	1		
Buffer shaft split pin	Passes through buffer-shaft washer.	Steel	1	0.187	2.3
Buffer shaft locking screw	Fits into front crosspiece (12 threads per inch).	do	1	.5	.85
Buffer shaft catch	Fits into buffer shaft	do	1		
Buffer springs	In recoil cylinders	do	2		
Catch button	Riveted to trail side	do	1		
Catch lever and spring	In handle of buffer shaft	do	1		
Catch lever split pin	do	do	1	3 by .25	1
Chain	To secure filling plug to cradle.	do	2		
Cup leather seating	In rear end of hydraulic cylinders.	Bronze No. 3	2		
Cup leather packing	Fits in cup leather seating	Leather	2		
Cup ring	In rear end of hydraulic cylinders.	Bronze No. 3	2		
Cradle	Hinged on front crosspiece by axletree.	Phosphorus bronze.	1		
Cleaning rod and brush	For cleaning gun	Steel	1		
Do	do	Bronze	1		
Do	do	Wood	1		
Distance plate	Riveted to trail side	Steel	2		
Drag washer	On end of axletree	do	2		
Drift	In tool chest	Bronze	1		
Do	On elevating-wheel spindle	Steel	1		
Elevating handle	do	do	1		
Elevating pin	Forms a joint for elevating wheel to front crosspiece.	Forged steel	1		
Elevating joint pin	Forms a joint for elevating quadrant to front crosspiece.	Steel No. 2	1		

List of principal parts, material, location, etc.—Continued.

Name of parts.	Location.	Material.	Number.	Diameter.	Length.
Elevating joint pin stop screw.	Sets joint pin in elevating quadrant.	Steel.....	1	<i>Inches.</i> 1 by 1	<i>Inches.</i> 0.6
Elevating spindle	Screw into elevating wheel for handle.	.....do.....	1	.....	.....
Elevating wheel spindle washer.	On end of spindle to hold handle in place.	Bronze	1	.....	.....
Elevating quadrant	Attached to front crosspiece by buffer shaft.	Cast steel No. 1 ..	1	.....	.....
Elevating wheel.....	Fits on elevating pin to elevate gun.	Bronze	1	.....	.....
Elevating wheel key	Screws elevating wheel to elevating pin.	Steel.....	1	.....	.....
End link of shaft.....	Riveted to end of shaft.....	Forged steel	2	.....	.....
Eyelets.....	Screws into end of springs for elevating quadrant.	Steel.....	4	.....	.....
Eye bolts.....	Screws into top of cradle at each end.	.....do.....	2	.875	.....
Do.....	Screws into shoe to secure chain.	Wrought iron.....	1	.....	.....
Filling plug packing	Under filling plug in cradle ..	Steel.....	4	.812	.....
Fore sight.....	Attached to foresight bracket.	.....do.....	1	.....	.....
Fore sight bracket.....	Attached to cradle	Bronze No. 1.....	1	.....	.....
Fore sight bracket screws.	Secures bracket to cradle	Steel.....	2	.875	.8
Front crosspiece.....	Riveted to front end of trail sides.	Phosphorus bronze.	1	.....	.....
Front handles.....	Riveted to front crosspiece and trail sides.	Forged steel	2	.....	.....
Front transom.....	Riveted to trail sides.....	Steel.....	1	.....	.....
Guard arm	Forms a hinge bearing for elevating quadrant.	.....do.....	1	.....	.....
Guard plate	Fastened to end of buffer shaft.	.....do.....	1	.....	.....
Guard plate screws.....	Fasten guard plate to buffer shaft.	.....do.....	2	.25	.7
Hammer	Implement chest	Steel, with wood handle.	1	.....	.....
Handspike	Fits in shoe at end of trail	Steel tubing	1	.....	.....
Instruction plate	Fastened to left side of cradle.	Bronze	1	.....	.....
Instruction plate screws.	To fasten plates to cradle	Brass.....	4	.1875	.45
Key.....	Passes through shoe and pivot.	Steel.....	1	.....	.....
Leather pocket foresight.	Fastened to right side of cradle.	Leather	1	.....	.....
Lifting rod.....	For lifting cradle onto pack mule.	Steel tubing	2	.....	.....
Linchpin	Passes through keyhole in axle-tree.	Steel.....	2	.....	.....
Liners (recoil).....	Soldered in recoil cylinders.....	Bronze No. 8.....	2	.....	.....
Loop.....	Fit over filling plug and attached to chain.	Steel.....	2	.....	.....
Name plate.....	Fastened to right side of cradle and rear of front crosspiece.	Bronze.....	2	.....	.....
Name plate screws	To fasten plate on cradle and front crosspiece.	Brass	4	.1875	.45
Oil can	Implement chest .....	.....do.....	1	.....	.....
Oil can plate	Riveted to trail sides.....	Steel.....	1	.....	.....
Oil can block.....	do.....	Wood, fitted with leather cover.	1	.....	.....
Pinch bar and tommy..	In tool chest.....	Steel.....	1	.....	.....
Piston rod protector.....	do.....	Leather.....	2	.....	.....
Pivot.....	Fits in shoe and socket.....	Steel.....	1	.....	.....
Pivot nut.....	Screws on end of pivot.....	.....do.....	1	.....	.....
Pivot washer.....	Fits on end of pivot.....	.....do.....	1	.....	.....
Pivot split key.....	Passes through pivot nut and pivot.	.....do.....	1	.1875	1.75
Plugs (filling).....	In top of recoil cylinders.....	.....do.....	4	.812	.....
Piston rod	In recoil cylinders.....	Forged steel No. 3.	2	.....	.....
Piston head	Screws onto end of piston rod.	.....do.....	2	.....	.....
Piston head lock screw.	Screws piston head to piston rod.	Forged steel No. 0.	2	.25	.45
Piston handle	Screws onto rear end of piston rod.	Forged steel No. 2.	2	.....	.....
Piston-handle rivets.....	Driven through piston handle and rod.	Forged steel No. 0.	2	.....	.....
Piston lock.....	Attached to recoil band and fits over end of piston rod when locked.	Forged steel No. 2.	2	.....	.....
Piston lock spring.....	On piston lock screw.....	Steel.....	2	.....	.....
Piston lock washer.....	On piston lock screw to keep spring in place.	.....do.....	2	.....	.....
Piston lock rivets	Forms hinge for piston lock and screw.	.....do.....	2	.....	.....
Piston lock screw	Screwed into recoil band forms hinge for piston lock.	.....do.....	2	.812	1.125

List of principal parts, material, location, etc.—Continued.

Name of parts.	Location.	Material.	Num-ber.	Diam-eter.	Length.
				<i>Inches.</i>	<i>Inches.</i>
Piston rod packing.....	In rear end of cup ring.....	Leather.....	2		
Rear transom.....	Riveted to trail sides.....	Steel.....	1		
Screwdriver.....	Implement chest.....	Steel, with wood- en handle.	1		
Scale plate.....	Fastened to right side of cradle.	Brass.....	1		
Scale plate screws.....	To fasten plate on cradle.....	do.....	6	.125	
Shaft.....	Attached to shoe by pivot.....	Steel tubing.....	2		
Shaft stay bracket.....	Riveted on side of shaft.....	Steel.....	2		
Shaft stay.....	Connected to shaft stay brace by stay bolt.	Steel tubing.....	1		
Shaft stay bolt.....	Forms joint for shaft stay and shaft stay bracket.	Steel.....	1		
Shaft stay bolt washers.....	Fits on end of shaft stay bolt.....	do.....	1		
Shaft stay bolt split pin.....	Passes through shaft and shaft stay washer.	do.....	1		
Shaft socket.....	On end of shafts.....	Bronze.....	1		
Split pin and link and shaft socket.....	Passes through shaft socket and shaft.	Link (brass), pin (steel).	1	.1875	
Shoe handles.....	Riveted to shoe and trail sides.	Steel.....	2		
Scraper.....	do.....	Forged steel.....	1		
Spring compression tool.....	In tool chests.....	Bronze, with steel pin.	1		
Spanner and screw- driver.....	For glands and sight bracket.....	Steel.....	1		
Stop button.....	Riveted to trail side.....	do.....	1		
Supporting plate.....	do.....	do.....	2		
Strengthening plate.....	do.....	do.....	1		
Spindle nut.....	Screws on end of elevating spindle.	do.....	1		
Spindle split pin.....	Passes through end of spindle to secure nut.	do.....	1		
Sleeve.....	On elevating spindle.....	Bronze.....	1		
Sleeve nut.....	Screws on sleeve.....	Steel.....	1		
Sleeve key.....	On elevating spindle to fasten sleeve.	do.....	1		
Sleeve split pin.....	Passes through sleeve and spindle to retain nut.	do.....	1	.37	
Spring carrier.....	In elevating quadrant to carry springs.	do.....	1		
Spring carrier split pin.....	Passes through spring carrier.....	do.....	2	.125	
Spring.....	Fits on sleeve.....	India rubber.....	1		
Spring cup.....	Fits over rubber spring.....	Steel.....	1		
Support.....	In front end of front crosspiece.	Forged steel No. 2.	1		
Steel spring.....	Attached to elevating quadrant and front crosspiece.	Steel.....	2		
Shoe.....	Riveted to rear end of trail sides.	Phosphorus bronze.	1		
Split pins.....	Through eyelets of springs.....	Steel.....	2	.375	
Twisted dog chain.....	To secure key for pivot to shoe.	Wrought iron.....	1		
Trail side.....	Riveted to shoe and front crosspiece.	Steel.....	2		
Wheel.....	On axletree.....	Wood, steel, brass.	2	.36	
Wheel hangers.....	On pack saddle.....	Forged steel.....	2		
Wrench.....	Buffer caps, glands, piston head, and elevating nuts.	Steel.....	1		
Do.....	Filling plugs and firing-pin joints.	do.....	1		
Worm.....	On sleeve which runs on ele- vating spindle.	do.....	1		
Worm key.....	Secures worm to sleeve.....	do.....	1		

Price of carriage, \$930.78.

RIGHTS.

/ The front sight for the 2.95-inch (75-millimeter) Vickers-Maxim mountain gun is a triangular pyramid, seen through the rear sight in elevation as a triangle. It is fastened to cradle by two screws near the muzzle.

The rear sight is an open V sight, composed of the following principal parts:

	Price.
1 graduated strip (124-pound projectile)	
1 graduated strip (20-pound double common shell)	
1 vertical limb	
1 rack	
1 rack pinion	
1 elevation slide	
1 elevation pinion	
1 sighting leaf	
1 deflection screw	
Total	\$38.00

FUSES.

The fuses used with the ammunition of the 2.95-inch (75-millimeter) Vickers-Maxim mountain gun are point percussion fuse for the common ring shell, base percussion fuse for the double common shell, and combination time percussion fuse for shrapnel, of Vickers-Maxim pattern. For more complete description see pamphlet on "fuses," issued by Ordnance Department.

A complete set of accessories, spare parts, etc., for gun and carriage, as enumerated on pages 547-548, should always be kept on hand.

In ordering spare parts for gun and carriage always give the name of maker, model, and number of gun or carriage for which parts are required.

SUBCALIBER TUBES.

There are issued for use with the 2.95-inch (75-millimeter) mountain gun drill cartridges equipped with subcaliber tubes, for subcaliber practice with .30-caliber small-arms cartridges. The allowance of such combined drill cartridges and subcaliber tubes is one tube for each gun.

The combined drill cartridge and subcaliber tube is composed of the following parts:

	Price each.
Projectile	\$4.70
Brass case	1.30
Bronze hoop	1.90
Bronze nose nut	1.15
Steel springs .....	.80
Steel rifle barrel	2.55
Assembling	11.91
Total	1.05
	12.96

There are furnished with each 2.95-inch (75-millimeter) mountain gun and carriage the following equipment, accessories, spare parts, etc.:

	Price each.
For the gun:	
1 breech cover (leather) (on gun)	
1 muzzle cover (leather) (on gun)	
1 paulin	
2 loupions for cradle with straps (on cradle load)	\$3.12
1 cradle cleaner (on cradle load)	2.60
1 buffer, spring (spare) (in tool-box trail load)	2.81
2 piston-rod protectors, with lashes (cradle load)	1.25

		Price each.
For the gun:		
2 leather tool boxes containing—		\$13.66
1 firing pin.....		1.91
6 firing-pin points.....		1.40
3 main springs.....		15.39
1 sear with spring.....		1.50
2 springs, sear.....		
1 locking bolt with spring (bolt, —; spring, \$0.39).....		
1 spring trigger pull.....		1.00
1 spring, hand lever catch.....		
1 split pin, hand lever catch.....		1.40
2 filling plugs (with chains).....		
2 leathers, cylinder cover.....		1.80
4 leathers, filling plug.....		1.00
6 leathers, gland, U shape.....		.50
2 leathers, gland, V shape.....		.12
4 split pins for mechanism.....		1.00
1 hammer.....		
1 brass drift.....		.83
1 steel drift.....		6.25
1 spanner (cylinder cover, piston head, and elevating-gear nut).....		1.40
1 spanner gland with screw-driver end.....		1.25
1 spanner, filling plugs, and firing-pin points.....		1.60
1 tommy with pinch-bar end.....		.60
1 tool (assembling buffer spring).....		.60
1 small screw-driver with wooden handle.....		.72
1 lanyard.....		
For carriage:		
1 cleaning rod with brush.....		6.00
2 lifting bars with lashes.....		
2 brake ropes.....		2.40
1 set of drag ropes.....		3.75
1 oil can with leather cover (in tool box on trail load).....		2.40
1 handspike (on trail load).....		3.75
1 set of shafts (on cradle load, steel).....		21.50

* If made of wood, \$17.86. Shafts are no longer to be a part of the equipment and will not be issued with new batteries under construction.

For the purpose of transportation the loads of the pack mules should be distributed to approximate in weight, including the saddle, about 300 pounds each.

Details of the loads and weights of each mule for the principal loads are as follows:

No. of mule.	Description of load.	Weights.	Price.
		<i>Pounds.</i>	
1	Gun, complete, with mechanism.....	286.0	
	Breech and muzzle covers.....	2.0	
	Crossbars (2).....	11.0	
	Saddle and numnah, harness, picket rope, and bridle.....	61.0	
	Total weight.....	300.0	
2	Cradle with buffers filled with oil.....	194.0	
	Shafts (1 pair).....	30.0	
	Crossbars and 2 tompons.....	18.0	
	Brushes and cleaning rod.....	6.0	
	Saddle, complete, with harness, etc.....	51.0	
	Total weight.....	294.0	
3	Trail with elevating gear and handspike.....	243.0	
	Boxes, spare parts and tools (2).....	13.0	
	Saddle, complete, with harness, etc.....	51.0	
	Total weight.....	307.0	
4	Wheels (2).....	141.0	
	Axle, linchpins and washers.....	48.0	
	Brake ropes and drag ropes.....	16.0	
	Hangers (1 pair).....	18.0	
	Saddle, complete, with harness, etc.....	51.0	
	Total weight.....	274.0	
5	Hangers (1 pair).....	18.0	
	Ammunition carriers (4).....	42.0	
	Rounds, complete (12).....	174.0	
	Saddle, complete, with harness, etc.....	51.0	
	Total weight (for common or ring shell or shrapnel).....	285.0	
	Total weight (for case shot).....	317.0	
	Price of complete pack outfit.....		\$220.00

COMPOSITION OF 2.95-INCH MOUNTAIN BATTERY.

A complete 2.95-inch (75-millimeter) mountain battery is composed of the following:

4 2.95-inch (75-millimeter) mountain guns.

4 2.95-inch (75-millimeter) mountain-gun carriages.

16 pack saddles (for guns and carriages).

36 ammunition packs (12 rounds each, approximately).

The packs for the gun, cradle, trail, etc., contain the material, spare parts, etc., enumerated on pages 547-548, 549-550.

Each ammunition pack for service ammunition carries 4 ammunition carriers, with 12 complete rounds each approximately.

The number of packs required to transport small-arms ammunition, farriers, artificers, and pioneer tools and supplies, has not been determined.

The following list of materials for cleaning and preservation and saddlery supplies will constitute the allowance for a mountain battery fully equipped for service, to be carried on a pack when the question of the number of packs for such purpose has been determined.

	Price each.
MATERIALS FOR CLEANING AND PRESERVATION.	
15 pounds wheel grease.....	\$0.04
5 gallons neatsfoot oil.....	.60
24 pints sperm oil.....	.12
12 quarts harness oil.....	.26
20 pounds harness soap.....	.14
10 pounds sponge.....	1.50
4 quires sandpaper (1 each), Nos. 24, 14, 1, and 00, per quire.....	.12
6 quires emery cloth (2 each), Nos. 90, 120, and 00, per quire.....	.42
2 quires crocus cloth.....	.84
2 pounds rotten stone.....	.04
25 papers tripoli.....	.06
12 pounds castile soap.....	.062
8 quarts crown soap.....	.38
6 quarts cosmetic, No. 80, soft.....	.11
6 pounds putz pomade.....	.25
1 box cleaning material, as provided for infantry, complete.....	9.80
SUPPLIES.	
2 sides russet leather, harness (40 pounds)..... per pound.....	5.25
2 sides russet leather, bridle (24 pounds).....	5.18
2 sides rawhide, soft.....	1.86
1 side sheepskin.....	.....
1 side buckskin.....	.....
3 pounds black wax.....	.10
2 pounds beeswax.....	.36
20 yards cotton duck 72 inches wide.....	.....
20 yards cotton duck 24 inches wide.....	.....
5 lantern globes..... per dozen.....	.75
42 buckles, iron roller, tinned (9 $\frac{1}{2}$, 12 $\frac{1}{2}$, 9 $\frac{1}{2}$, 12 $\frac{1}{2}$, and 6 $\frac{1}{2}$ inch).....	.....
42 buckles, iron barrel roller, tinned (24 $\frac{1}{2}$ -inch, 12 $\frac{1}{2}$ -inch, and 6 $\frac{1}{2}$ inch).....	.....
2 papers tacks, copper (1 12-ounce and 1 20-ounce).....	.85
3 papers tacks, iron (1 each 8, 12, and 18 ounces).....	.086
3 pounds rivets and burrs, brass (1 $\frac{1}{2}$ No. 10, 1 $\frac{1}{2}$ -inch No. 10, and 1 $\frac{1}{2}$ -inch No. 8).....	.17
6 pounds thread (1 No. 3, 1 No. 10, and 8 No. 10 half bleached).....	.90
1 pound linen carpet thread No. 18.....	.98
2 needles, collar (1 No. 4, 1 No. 4 $\frac{1}{2}$).....	.11
50 harness needles (25 No. 5, 25 No. 6).....	.01
3 thimbles.....	.04
10 pounds nails (6 eightpenny, 6 tenpenny).....	.02
1 gross wood screws (1-inch No. 8).....	.48
1 pound hemp cord (4-inch diameter)..... per pound.....	.115
2 pieces sash cord, braided (13 $\frac{1}{2}$ pounds).....	.81
2 gallons coal oil.....	.12
MISCELLANEOUS.	
6 lanterns..... per dozen.....	.60
3 burners for lanterns.....	.40
6 wicks for lanterns..... do.....	.05
3 globes for lanterns..... do.....	.75
50 girth straps, spare.....	.....
50 rawhide lashes, spare.....	.....
25 pounds horsehair.....	.....
1 base percussion fuse, Vickers-Maxim, sectional.....	.....
1 point percussion fuse, Vickers-Maxim, sectional.....	.....

	Price each.
MISCELLANEOUS—continued.	
1 combination time percussion fuse, Vickers-Maxim, sectional.....	85.51
1 marking outfit, complete.....	18.45
2 range finders, Weldon.....	2.50
1 seal stamp.....	
1 empty shrapnel for instruction, sectional.....	1.31
1 stencil outfit, complete.....	5.75
2 time-interval recorders.....	16.00
2 gunner's quadrants.....	

The pioneer tools to be carried are as follows:

	Price each.
2 felling axes, handled.....	
1 crowbar, steel.....	
2 sledge hammers (8 pounds), handled.....	
4 bill hooks.....	
4 pickaxes, handled.....	
4 shovels.....	
4 reaping hooks.....	
4 hatchets.....	
50 feet of 1-inch hemp or manila rope.....	

SIX MONTHS' ALLOWANCE OF SUPPLIES.

The following allowance of supplies constitutes a six months' supply for a complete mountain battery. The allowance of material given on page 549 as contained in the supply pack is not to be considered a part of this allowance, and will not be taken into consideration in specifying the amount of material on hand when making requisition for six months' supply or any part of it. The supply to equip "supply pack" or an equal amount is to be kept always on hand ready for immediate field service.

	Price each.
MATERIALS FOR CLEANING AND PRESERVATION.	
4 quires sandpaper, 1 each Nos. 2½, 1½, 1, and 00.....	\$0.12
5 quires crocus cloth.....	.04
6 quires emery cloth, 2 each Nos. 90, 120, and 00.....	.45
10 pounds putz pomade.....	.25
25 papers tripoli.....	.66
30 pounds harness soap.....	.14
25 pounds castile soap.....	.06
5 quarts crown soap.....	.32
10 gallons neatfoot oil.....	.60
3 pounds borax.....	.09
10 quarts cosmic, No. 80, soft.....	.11
5 gallons harness oil.....	1.04
15 pounds cotton waste.....	.06
8 pounds sponge.....	1.50
8 gallons sperm oil.....	.96
25 pounds axle grease.....	.04
1 box cleaning material (infantry) complete.....	9.30
PAINTS, ETC.	
5 pounds paint, lead colored.....	.11
5 pounds paint, black (quick drying).....	.22
15 pounds paint, olive (quick drying).....	.18
½ pound paint, first coat, for 3.2-inch B. L. rifle.....	.12
½ pound paint, second coat, for 3.2-inch B. L. rifle.....	.14
2 gallons linseed oil, boiled.....	.60
1 gallon spirits of turpentine.....	.53
2 pieces esch cord (18½ pounds each).....	.81
1 pound of hemp cord, ¼-inch diameter.....	
2 brushes, paint, 1 each Nos. 3 and 4.....	.50
2 esch tools, 1 each Nos. 2 and 3.....	.02

	Price each.
SADDLERS' MATERIAL.	
1 pound linen carpet thread, No. 18	\$0.96
1 pound shoe thread, No. 3	.90
3 pounds shoe thread, No. 10 (half bleached)	.90
2 pounds shoe thread, yellow, 1 each Nos. 3 and 10	.90
50 yards cotton duck, 72 inches wide	
50 yards cotton duck, 24 inches wide	
75 pounds leather (russel), harness	.525
2 sides leather (russel), bridle	5.18
1½ sides rawhide	1.85
1 side sheepskin	
1 side buckskin	
1 pound beeswax	.36
8 ounces white wax	per pound .06
10 awls, stitching, assorted	.06
3 awl handles, plain	.17
1 paper needles, harness, No. 6	.0525
1 paper needles, harness, No. 8	.0525
1 paper needles, glover's, No. 8	.055
2 thumbies	.04
1 ounce bristles	.82
2 halter squares, 1½ and 1½ inch, tinned	
12 buckles, iron roller, ½-inch, tinned	
6 buckles, iron roller, ½-inch, tinned	
36 buckles, iron roller, 1-inch, tinned	
12 buckles, iron roller, 1½-inch, tinned	
36 buckles, iron roller, 1½-inch, tinned	
12 buckles, iron roller, 1½-inch, tinned	
48 buckles, iron barrel roller, ½-inch, tinned	
24 buckles, iron barrel roller, 1-inch, tinned	
12 buckles, iron barrel roller, 1½-inch, tinned	
36 D rings, ½-inch, tinned	
12 D rings, 1-inch, tinned	
18 D rings, 1½-inch, tinned	
12 iron rings, 1½-inch, tinned	
12 iron rings, 1½-inch, tinned	
6 iron rings, 1½-inch, tinned	
6 iron rings, 1½-inch, tinned	
36 iron rings, 2-inch, tinned	
6 iron rings, 2½-inch, tinned	
36 iron rings, 2½-inch, tinned	
3 dozen screws, brass, 1-inch, No. 6, per gross	.38
3 dozen screws, iron, 1-inch, No. 8, per gross	.24
6 halter bolts	.01
3 halter-swivel rings	.0325
3 covert snaps, 1-inch	.07
2 brass foot staples, high	.02
2 brass foot staples, low	.02
2 brass foot staples, semicircular	.02
6 brass wire double hooks	.09
6 brass wire end hooks	.017
6 brass wire squares, ½-inch	.01
6 brass wire loops, 2-inch	.015
2 iron foot staples, high	.01
2 iron foot staples, low	.01
2 iron foot staples, semicircular	.01
15 saddle nails, japanned, per gross	2.25
3 papers tacks, iron, 6, 8, and 12 ounce	.03
2 papers tacks, copper, 12 and 20 ounce	.55
2 ovals for saddlebags	.01
2 ovals for saddles	.05
2ariat snap hooks	.06
2ariat-strap snap hooks	.06
2 link-strap hooks	.06
2 saddlebag studs	.03
3 saddle shields, 1 each, 11, 11½, and 12 inch	.01
2 bridle ornaments	.04
MISCELLANEOUS MATERIALS.	
2 burners for railroad lanterns	per dozen .40
5 wicks for railroad lanterns	do. .06
1 box of stencil paste	
3 globes for railroad lanterns	per dozen .25
25 pounds horsehair	
50 lashes, rawhide, spare	
50 girth straps, spare	

Component parts of pack saddle, etc.

	Price.
HALTER BRIDLE.	
1 crown	
1 brow band	
1 throat strap	
1 nose piece	
1 chin piece	
1 gullet	
1 rein	
1 lead strap	
1 tie strap	
7 iron roller buckles, $\frac{1}{2}$ -inch	
1 iron roller buckle, $\frac{1}{2}$ -inch	
1 iron roller buckle, $\frac{1}{4}$ -inch	
2 squares, $\frac{1}{2}$ -inch and $\frac{1}{4}$ -inch	
1 ring, $\frac{1}{2}$ -inch	
1 ring, $\frac{1}{4}$ -inch	
1 ring, $\frac{1}{8}$ -inch	
1 bit, curb, nickel-plated	
1 halter-rope ring, $\frac{3}{4}$ -inch	
SADDLE.	
1 body	
1 leather cover	
1 reinforce strap	
2 saddle wear leathers	
2 iron strap wear leathers	
4 iron D rings, $\frac{1}{2}$ -inch	
2 iron D rings, $\frac{1}{4}$ -inch	
2 iron roller buckles, $\frac{1}{2}$ -inch	
3 lacing thongs, rawhide	
2 lacing thongs, wear leather	
Metal parts.	
1 pommel, front, bronze (top covered with leather)	
1 cantle, rear, bronze (top covered with leather)	
2 side bars, steel	
1 saddle tie rod, steel (bend covered with leather)	
4 saddle arches, D steel	
4 saddle bars, D steel	
4 staples	
2 saddle arch staples, steel	
16 rivets, $\frac{1}{4}$ -inch	
2 rivets, $\frac{1}{2}$ -inch	
2 corrugated side plates, 18-inch steel	
BELLYBAND.	
1 body	
3 iron roller buckles, $\frac{1}{2}$ -inch	
BREAST COLLAR.	
1 body	
2 pulling tugs	
1 shoulder strap	
2 shoulder-strap buckle pieces	
1 martingale billet	
1 martingale loop	
2 iron roller buckles, $\frac{1}{2}$ -inch	
3 iron roller buckles, 1-inch	
2 iron rings, $\frac{1}{4}$ -inch	
1 iron D ring, 1-inch	
3 saddle straps, body	
3 iron roller buckles, $\frac{1}{2}$ -inch, for saddle straps	
BREECHING.	
1 body	
2 side straps (shaft)	
2 side straps (pad)	
1 hip strap	
2 hip-strap buckle pieces	
1 back strap, body	
1 back strap, billet	
1 back strap, crupper	
5 iron roller buckles, 1-inch	
4 iron roller buckles, $\frac{1}{2}$ -inch	
2 iron roller rings, $\frac{1}{2}$ -inch	
2 iron D rings, $\frac{1}{4}$ inch	

Component parts of pack saddle, etc.—Continued.

	Price.
AMMUNITION-HANGER STRAP.	
1 body.....	
1 buckle piece.....	
1 iron roller buckle, 1½-inch.....	
2 sockets.....	
TOOL CASE (INSIDE POCKET).	
1 body.....	
2 ends.....	
2 pockets (inside).....	
2 flaps (end).....	
1 letter case.....	
2 iron D rings, 1½-inch.....	
1 iron D ring, ¾-inch.....	
2 iron bar roller buckles, ¾-inch.....	
2 brass buttons.....	
2 sheet-iron washers.....	
TOOL CASE (INSIDE STRAPS).	
1 body.....	
2 ends.....	
2 straps.....	
2 flaps (end).....	
1 letter case.....	
2 iron D rings, 1½-inch.....	
1 iron D ring, ¾-inch.....	
2 iron bar roller buckles, ¾-inch.....	
2 iron bar buckles, ¾-inch.....	
2 brass buttons.....	
2 sheet-iron washers.....	
WHEEL CARRIERS.	
1 hanger, steel.....	
1 axle stub, bronze.....	
2 pads, leather.....	
4 rivets, steel.....	
4 rivets, copper, No. 5.....	
AMMUNITION HANGER.	
1 bottom rail, angle, 1 by ½ inch.....	Steel.....
2 end posts of hanger, angle, 1 by ½ inch, right and left..	
2 hangers, side bars, right and left, 1 by ½ inch.....	
2 hangers, rear bars, 1 by ½ inch.....	
1 hanger, top bar, 1 by ½ inch.....	
2 angles, ½ by ½ inch.....	
4 hanger staples, ½-inch, round.....	
2 hanger rings, 1-inch diameter with 1-inch flange.....	
2 hanger rests, 1 by ½ inch.....	
2 leather pads for hanger rests.....	
24 rivets, ½-inch, steel.....	
2 rivets, ¾-inch, steel.....	
PAD FOR TRAIL PACK.	
AMMUNITION CARRIER.	
1 end plate, ½-inch.....	Steel.....
1 cartridge-case holder (small end), ½-inch, flanged ½-inch.....	
1 cartridge-case holder, middle brace, ½-inch.....	
1 cartridge-case holder (large end), ½-inch, flanged ½-inch.....	
1 lid, ½-inch, flanged ½-inch.....	
1 bottom rail.....	
2 bottom rails, angle ½ by ¾ inch.....	
2 top rails, angle ½ by ¾ inch.....	
1 clasp, ¾-inch.....	
1 turn-buckle, and washer, brass.....	
1 turn-buckle plate, ½-inch.....	
2 handle staples, ½-inch.....	
8 separators, ½-inch tubing.....	
8 shell holders, sheet brass, 15½ inches long, 3-inch small end, 3½-inch, large..	
24 rivets, ¾-inch.....	
8 rivets, brass.....	
1 piece felt.....	
1 handle leather.....	

Component parts of pack saddle, etc.—Continued.

	Price.
CINCHAS.	
1 body, duck	
2 frames, gun metal	
1 strap, cincha	
LOAD STRAPS.	
2 bodies	
2 iron roller buckles, 1½ inch	
4 hanger straps	
TUGS.	
2 bodies	
2 iron roller buckles, 1½ inch	
2 iron roller buckles, 1½ inch	
Price of pack saddle, complete	

Component parts of equipment are as follows:

	Price.
PICKET ROPE.	
1 rope and loop	
1 iron ring, ½ inch	
1 iron ring, 1½ inch	
DRAO ROPE.	
1 swivel (link, chain, and hook)	
1 steel eye	
20 feet ½-inch diameter manila rope	
BRAKE ROPE.	
1 steel bucket and link	
4 steel bucket and eye	
8 feet manila rope	
2 lifting rods (steel)	
2 crombars (steel, with leather cover) for gun pack	
CRADLE CLEANER.	
2 pieces felt, ½ inch thick	
2 iron plates	
1 handle (iron)	
6 copper rivets, ½ inch	
FRONT-SIGHT COVER (LEATHER).	
1 body	
2 end pieces	
1 strap	
1 ½-inch iron tinued buckle	
TANGENT-SIGHT COVER (LEATHER).	
1 back and flap	
1 front	
1 brass button	
1 sheet-iron washer	
BREECH COVER (LEATHER).	
1 body	
2 ends	
2 straps	
2 iron roller buckles, ½ inch	
MUZZLE COVER (LEATHER).	
1 body	
1 end	
1 iron roller buckle, ½ inch	
1 strap	
TOMPION FOR CRADLE.	
1 set of tompions, sheet iron	
2 straps	
2 iron roller buckles, 1 inch	

The pack saddles of the Vickers-Maxim make, issued with the guns of English manufacture and in the service at the present time, will be retained in the service until worn out. They will then be replaced by a modified pack saddle made at Rock Island Arsenal, and embodying the changes recommended by a board of officers convened for that purpose. All saddles issued in the future will be of this pattern.

The system adopted consists of a frame fitted to the aparejo and attached thereto by the aparejo cincha, supplemented by simple lashings, which take the place of the lash rope and diamond hitch. The feature of this new system is the substitution of latigo straps and rendering rings for the multiplicity of straps and buckles of the English saddle, thus permitting accurate adjustment of the lashing by differential cinching, and at the same time adding greatly to the durability of the equipment.

The aparejo to be used will be a modification of the regulation supplied by the Quartermaster's Department, with a view to facilitating packing, and to securing uniformity and dispensing with the services of a skilled packer; the old style of boot sticks and willow wands are to be replaced by dressed hickory wands and basswood boot and top sticks prepared by the Department after special designs.

PERSONAL EQUIPMENT OF MOUNTAIN BATTERY.

The equipment of mountain-battery soldier is the same as that provided for the infantry soldier, substituting the carbine for the rifle. See page 625.

The equipment of the noncommissioned officers, musicians, etc., mounted separately, is the same as that provided for the cavalry. See page 628.

For each horse or mule, except officers' horses, there will be furnished—

Parts.	Price.
1 saddle blanket.....	\$2.70
1 watering bridle (russet leather).....	1.88
1 lariat.....	.78
1 noselag (russet leather).....	1.04
1 picket pin.....	.86
1 surcingle (russet leather).....	.85
1 horse brush.....	.97
1 currycomb.....	.22

For each battery, as part of original equipment, there will be issued—

1 stirrup, with bowl and socket for guidon.

5 cinchas, extra.

CHAPTER XV.

GATLING AND AUTOMATIC GUNS.

GATLING GUNS, CALIBER .45.

Gatling guns of .45 caliber, either 5 or 10 (long or short) barrel, are no longer issued to the service, but are issued to the State militia and colleges.

For a complete description, list of parts, etc., of these guns, see pamphlet "Description of Gatling Guns, Caliber .45, with Rules and Regulations for their Inspection," etc., issued by the Ordnance Department.

GATLING GUN, CALIBER .30, 10 BARREL, MODEL 1895.

For full description see pamphlet "Nomenclature and Description of the Gatling Gun, Caliber .30," published by Ordnance Department.

These arms are issued to any arm of the service, but principally to cavalry and infantry as an auxiliary artillery arm.

If a company of infantry, troop of cavalry, battery of field artillery, or other troops be equipped as a "Gatling-gun battery," such battery will be equipped with 6 Gatling guns, caliber .30, and limbers, complete, each drawn by 4 horses; 1 forge and battery wagon (light artillery), drawn by 6 horses, and 1 artillery store wagon, drawn by 4 horses, 8 sets of wheel harness for 2 horses and 9 sets of lead harness for 2 horses.

Component parts of Gatling gun, caliber .30, model 1895.

Parts.	Price each.
Frame	\$120.00
Trunnions, 2 at \$1.50	8.00
Front sight	2.25
Front-sight screw .....	.15
Crank latch	2.50
Crank-latch screw .....	.10
Crank-latch washer .....	.15
Bullet rest .....	.65
Bullet-rest pin .....	.05
Bullet-rest screws, 2 at 5 cents each .....	.10
Gas collar .....	.75
Screw cap	1.25
Adjusting knob	15.00
Adjusting-knob screw .....	.10
Adjusting-knob spring	2.75
Adjusting-knob spring screw .....	.05
Adjusting-knob washer	2.25
Main shaft	29.00
Main-shaft casing (leather)	1.00
Front spline .....	.75
Front-spline screws .....	.05
Middle spline	1.00
Middle-spline screw, 2 at 5 cents each .....	.10
Rear spline .....	.50
Rear-spline rivet .....	.05
Worm gear	5.50

Component parts of Gatling gun, caliber .30, model 1895—Continued.

Parts.	Price each.
Barrels, 10 at \$18 each.....	\$180.00
Barrel plate, front.....	6.00
Barrel plate, rear.....	15.00
Barrel-plate key.....	1.00
Carrier block.....	40.00
Carrier-block dowel pin.....	1.50
Hopper body.....	60.00
Hopper-hinge block.....	8.00
Hopper-hinge block screws, 2 at 50 cents each.....	1.00
Hopper-hinge pin.....	1.25
Hopper-latch.....	8.25
Hopper-latch screw.....	.25
Hopper-latch spring.....	.25
Plow.....	2.75
Plow screws, 2 at 5 cents each.....	.10
Hopper throat, left wall.....	9.00
Hopper throat, right wall.....	9.00
Hopper-throat dowel pin.....	.05
Hopper-throat plate.....	\$2.00
Hopper-throat plate screw, left.....	.15
Hopper-throat plate screw, right.....	.15
Hopper-throat screws, 4 at 10 cents each.....	.40
Hopper-throat wheel.....	1.00
Hopper-throat wheel pivot.....	.40
Hopper-throat wheel bushings, 2 at 20 cents each.....	2.00
Hopper thumbcrew.....	\$2.00
Lock cylinder, body.....	4.00
Lock cylinder, face.....	.10
Lock-cylinder screws, 2 at 5 cents each.....	2.00
Rear-guide nut.....	.25
Rear-guide nut key.....	.10
Rear-guide nut-key screw.....	43.00
Breech casing.....	2.10
Breech-casing screws, 6 at 35 cents each.....	9.00
Diaphragm, body.....	.60
Diaphragm screws, 2 at 25 cents each.....	2.50
Lock-plug sleeve.....	.15
Lock-plug sleeve screws, 3 at 5 cents each.....	30.00
Cam body.....	.50
Cam screws, 2 at 25 cents each.....	10.00
Recoil plate.....	.70
Recoil plate screws, 2 at 35 cents each.....	10.50
Cocking switch.....	.25
Cocking switch spring.....	.25
Cocking switch spring spindle.....	1.50
Cocking-switch screw.....	.20
Cocking switch knob.....	8.50
Cocking switch knob sleeve.....	2.00
Cocking-switch plug.....	1.60
Cocking-switch plug pins, 2 at 5 cents each.....	.10
Cocking-switch plug spindle.....	1.25
Cocking-switch plug-spindle pin.....	.05
Cocking-switch plug spring.....	.25
Casable plate.....	17.00
Casable plate screws, 2 at 50 cents each.....	1.00
Lock-plug body.....	2.50
Lock-plug chain and screw eye.....	.75
Lock-plug handle.....	6.50
Lock-plug hook.....	2.00
Lock-plug hook screws, 2 at 5 cents each.....	.10
Lock-plug screw.....	.10
Lock tube.....	\$7.20
Main spring.....	.50
Extractor.....	1.50
Extractor screw.....	.05
Firing pin.....	1.50
Firing-pin nut.....	.30
Firing-pin nut pin.....	.05
Firing-pin bushing.....	.85
Firing-pin bushing screw.....	.05
Firing-pin sleeve.....	.50
Lock, complete, 10, each.....	125.00
Rear sight.....	4.50
Rear-sight seat.....	6.25
Rear-sight seat screw.....	.75
Rear-sight spring.....	1.00
Rear-sight spring screw.....	.40
Crank shaft.....	6.50
Crank-shaft collar.....	.50
Crank-shaft splines.....	.25
Crank-shaft worm.....	6.50
Crank-shaft key.....	.25

Component parts of Gatling gun, caliber .30, model 1895—Continued.

Parts.	Price each.
Crank.....	\$8.00
Crank handle.....	4.25
Crank-handle rivet.....	2.25
Crank key.....	.25
Feed-guide body.....	\$20.00
Feed-guide neck.....	20.00
Feed-guide neck screws, 4 at 10 cents each.....	.40
Feed-guide pendulum.....	18.00
Feed-guide pendulum screw.....	.60
Feed-guide pendulum spring.....	.25
Feed-guide pendulum-spring spindle.....	.75
Feed guide, complete, 2, each.....	60.00
Pointing lever.....	56.00
Binder box.....	8.00
Binder-box pin.....	8.00
Binder-box pin key.....	1.00
Binder-box washer.....	.40
Binder-box plate.....	8.50
Binder-box screw.....	6.00
Lever-axis pin.....	8.75
Lever-axis pin nut.....	.60
Lever-axis pin washer.....	.45
Implements, sets of (for details of set, see next paragraph).....	8.75
	\$1,100.00

TOOLS AND IMPLEMENTS FOR GATLING GUN, CALIBER .30.

The following tools and implements are issued with and carried in the trail compartment of each Gatling gun:

Parts.	Price each.
1 drift.....	\$0.20
2 Bruce feed wires.....	
1 lock screw-driver.....	1.00
1 pin wrench.....	.25
1 lever axis pin nut wrench.....	.75
1 rear-guide nut wrench.....	.75
1 shell driver.....	1.50
1 screwdriver, small.....	.25
1 screw-driver, T.....	2.00
1 wiping rod, brass.....	1.20
1 cascabel plate wrench.....	.75
Total.....	8.75

PARTS FOR GUN.

The following parts of gun are issued with each gun, estimated to be one years' supply:

Parts.	Price each.
1 axis pin.....	8.75
1 axis-pin washer.....	.60
1 axis-pin nut.....	.45
1 binder box.....	8.00
1 binder-box plate.....	8.50
1 binder-box screw pin.....	8.00
1 binder-box washer.....	1.00
1 binder-box key.....	4.25
1 crank handle.....	2.25
1 crank-handle pin.....	56.00
1 pointing lever.....	12.50
1 spare lock, complete.....	1.50
2 extractors.....	.05
2 extractor screws.....	
Spare parts:	
1 mainspring.....	.50
1 firing pin.....	1.50
1 firing-pin vent pin.....	.05
1 firing-pin bushing screw.....	.05

Gatling guns, caliber .30, are to be provided with an extensible sight graduated up to 2,000 yards with a wind-gauge adjustment. This sight has a sliding eyepiece moving in a stem or leaf of the sight. In the rear face of the sliding eyepiece is milled a slot into which a set screw is fitted for use to clamp the eyepiece at any point desired, as well as a stop (as soon as it enters the slot) to prevent the eyepiece from coming out entirely.

GATLING GUN, MODEL 1903.

A supply of new Gatling guns is being procured by the Ordnance Department for issue to the service, known as "Gatling gun, model 1903." This gun is constructed to use the same ammunition as the United States magazine rifle, caliber .30, with muzzle velocity of 2,300 foot-seconds.

The nomenclature of the parts of this gun will be practically the same as for the old model Gatling gun, caliber .30; likewise the carriage. There will be some changes in the feed-guide mechanism, and if any changes be effected in the nomenclature of the parts connected therewith, same will be published in leaflet form as an addendum, to be inserted later.

GATLING GUN CARRIAGE, MODEL 1890 (METALLIC).

The component parts of the metallic Gatling gun carriage, model 1890, are as follows:

Parts.	Weight.	Price
	Lbs. ozs.	each.
Wheel, complete:		
Tire.....		
Fellies.....		
Felly bolts.....		
Felly nuts.....		
Spokes.....		
Nave boxes.....		
Nave-box flanges.....		
Nave-box bolts.....		
Nave-box nuts.....		
Dowels.....		
Body, complete (this is also the axle body and forms the cartridge compartment):		
Upper plate.....		
Lower plate.....		
Front plate.....		
Rear plates, inside, right and left.....		
Rear plates, outside, right and left.....		
Cartridge-compartment doors, hinges, and pins.....		
Cartridge-compartment door turn-buckles.....		
Cartridge-compartment door turn-buckle studs.....		
Pintle socket (for mount).....		
Pintle socket stop pins.....		
Axle spindles.....		
Axle-spindle bolts and nuts.....		
Axle iron.....		
Axle quoins.....		
Angle irons.....		
Rivets.....		
Linch washers.....		
Linchpins.....		
Linchpin clasp.....		
Linchpin clasp rivets.....		
Trail, complete:		
Top plate.....		
Bottom plate.....		
Side plates.....		
Transom.....		
Upper door.....		
Upper-door hinges.....		
Upper-door hinge pins.....		
Upper-door key.....		
Upper-door key eyebolt.....		
Upper-door key chain.....		
Upper-door key-chain rings.....		
Upper-door key-chain eye pin.....		
Lower-door and seat.....		
Lower-door seat-plate hinges.....		
Lower-door seat-plate hinge pins.....		
Seat prop.....		
Seat-prop hinge.....		
Seat-prop hinge strap.....		
Seat-prop hinge pin.....		

Parts.	Weight.	Price each.
Trail, complete—Continued.	<i>Lbs. oss.</i>	
Seat-prop rest		
Lunette		
Lunette plate		
Lunette-plate handspike attachment		
Handspike		
Handspike bolt		
Handspike nut		
Handles		
Angle irons		
Rivets		
Shield, complete: ^a		
Shield		
Shield attachments		
Shield-attachments bolts		
Shield-attachments nuts		
Apron, complete:		
Apron		
Apron hinges		
Apron-hinge pins		
Turn-buckle		
Turn-buckle stud		
Mount, complete:		
Body		
Cap squares		
Hinge pins		
Locking keys		
Locking-key securing screws		
Clamp screws		
Clamp-screw handle		
Clamp-screw handle pin		
Clamp-screw stop pin		
Clamp-screw washer nut		
Clamp-screw washer-nut securing screw pin		
Clamp-screw stop washer		
Clamp-screw stop-washer pin		
Total with shield		\$656.22
<i>Limber.</i>		
Wheels, complete:		
Tire		
Tire bolts		
Tire nuts		
Tire washers		
Fellies		
Rivets and burrs for fellies		
Spokes		
Nave boxes—		
Nave-box flanges		
Nave-box bolts		
Nave-box nuts		
Dowels		
Body (metal) and connected parts:		
Axle		
Linchpins		
Linchpin clasps		
Linch washers		
Hounds		
Fork		
Crossbar		
Undertraps (attaching fork and hounds to axle and crossbar to fork)		
Corner brackets, connecting crossbar to hounds		
Pintle—		
Pintle bolts		
Pintle nuts		
Pintle key		
Pintle-key chain		
Pole-prop—		
Pole-prop eye		
Pole-prop spring		
Footboards, metal		
Rack in front of chest—		
Standards of rack riveted to body		
Bolts for rack		
Nuts for rack		
Pole, complete		
Pole shoe		
Pole neck-yoke stop		
Pole key		
Pole key safety spring		
Doubletree bolt		
Doubletree stay		
Doubletree stay bolts		

^a The shields are a part of, and issued with, the carriage, but not attached to same for shipment, \$250.

Parts.	Weight.	Price each.
	<i>Lbs. oss.</i>	
Body (metal) and connected parts—Continued.		
Doubletree stay chains		
Doubletrees (wood, ironed)		
Singletrees (wood, ironed)		
Neck yoke (wood, ironed)		
Pole pad		
Neck-yoke pads		
Ammunition chest (wood, ironed)		
Chest		
Lid		
Hinges		
Hasp		
Turn-buckle		
Turn-buckle stud		
Corner irons		
End irons		
Shield		
Canvas cover on lid		
Paulin straps on lid		
Partitions, wooden (2)		
Copper strips (covering hinge and hasp straps)		
To attach chest to body of limber—		
Ammunition-chest bolts		
Ammunition-chest nuts		
Ammunition-chest plates		
The following implements and equipment are carried on the limber:		
2 watering buckets (on footboards)		
Underneath footboard—		
1 spade		
1 shovel		
On front of limber chest—		
2 axes		
1 mattock		
Total		\$305.90

SPARE PARTS FOR GATLING GUN CARRIAGE.

The following parts for Gatling gun carriage are issued for repairs when needed:

Parts.	Price each.
Wheels, complete:	
Tires	
Fellies	
Felly bolts	
Felly nuts	
Spokes	
Nave boxes, complete:	
Nave-box flanges	
Nave-box bolts	
Nave-box nuts	
Dowels	
Linchpins:	
Linch washers	
Linchpin clasps	
Linchpin rivets	
Cartridge compartment doors, complete, with hinges and pins:	
Cartridge compartment-door hinges	
Cartridge compartment-door hinge pins	
Cartridge compartment-door turn-buckles	
Cartridge compartment-door turn-buckle studs	
Upper door hinges:	
Upper door hinge pins	
Upper door keys:	
Upper door key eyebolts	
Upper door key chain	
Upper door key rings	
Upper door key eye pins	
Lower door and seat:	
Lower door seat hinges	
Lower door seat hinge pins	
Seat props:	
Seat-prop hinges	
Seat-prop hinge straps	
Seat-prop hinge pins	
Seat-prop rests	
Trail handspikes, complete:	
Parts of same—	
Trail-handspike handle	
Trail-handspike joint end of handle	
Trail-handspike bolt	
Trail-handspike bolt key	
Trail-handspike bolt nut	

If the carriage should be damaged to such an extent as to not readily admit of repairs by the issue of the parts above specified, authority should be obtained to turn the carriage into Rock Island Arsenal for repairs.

SPARE PARTS FOR LIMBER FOR GATLING GUN CARRIAGE.

The following parts of the Gatling gun-carriage limber are issued for repairs when needed.

	Price each.
Wheel, complete:	
Tire	
Tire bolts	
Tire nuts	
Tire washers	
Nave boxes, complete—	
Nave-box flanges	
Nave-box flange bolts	
Nave-box flange-bolt nuts	
Dowels	
Linchpins:	
Linchpin clamps	
Linch washers	
Pintles, complete:	
Pintle bolts	
Pintle nuts	
Pintle key and chain	
Pintle-key chain	
Pole props:	
Pole-prop eye	
Pole-prop spring	
Pole, complete:	
Pole shoe	
Pole neck-yoke stop	
Pole key	
Pole-key safety spring	
Pole pads	
Doubletree, complete:	
Pole for doubletree	
Doubletree (wood, ironed)	
Doubletree bolts	
Doubletree stays	
Doubletree stay bolts	
Doubletree stay chains	
Singletrees, complete:	
Parts for singletrees—	
Singletrees (wood, ironed)	
Singletree center eyes	
Singletree trace hooks	
Singletree rivets	
Neck yokes, complete:	
Parts for neck yoke—	
Neck-yoke center eye sleeve	
Neck-yoke eye bands	
Neck-yoke eye rings	
Pole-strap eye loops	
Pole-strap eye-loop rollers	
Martingale staples	
Neck-yoke center eye-sleeve rivets	
Neck-yoke eye-band rivets	
Neck-yoke body (wood)	
Neck-yoke pads	
Ammunition chest, complete:	
Parts for ammunition chest—	
Chest	
Lid	
Hinges	
Hasp	
Turn-buckle	
Turn-buckle stud	
Corner irons	
End irons	
Shield	
Canvas cover for lid	
Paulin straps on lid	
Wooden partitions	
Copper straps (for covering hinge and hasp straps)	
Bolts, for attaching chest	
Nuts, for attaching chest	
Plates, for attaching chest	

If the limber be damaged to such an extent as to not admit of its repair readily with the issue of the articles enumerated in previous paragraph, authority should be obtained to turn in the limber to Rock Island Arsenal for repair.

TRIPOD FOR GATLING GUN.

Tripods are issued for the purpose of mounting gatling guns in permanent or temporary fortifications when required. The component parts of tripod are:

	Weight.	Price each.
	<i>Lbs. ozs.</i>	
Trunnion swivel.....		
Trunnion-swivel stop.....		
Cline bolts (2).....		
Key bolts (2).....		
Cap squares (2).....		
Cap-square keys (2).....		
Cap-square key rings (2).....		
Cap-square key chains (2).....		
Cap-square eye pins (4).....		
Cap-square eye-pin rings (4).....		
Cap-square eye-pin ring chains (2).....		
Pivot bolt.....		
Pivot-bolt nut.....		
Pivot-bolt washer.....		
Pivot-bolt key.....		
Turntable.....		
Turntable bed plate.....		
Turntable binder.....		
Turntable-binder washer.....		
Turntable-binder handle.....		
Turntable-binder handle stop screw.....		
Turntable-binder pivot screw.....		
Elevating screw.....		
Elevating-screw hand wheel.....		
Elevating-screw box.....		
Elevating-screw box-lifter.....		
Elevating-screw box-lifter screws (2).....		
Elevating-screw box binder.....		
Elevating-screw box-binder handle.....		
Elevating-screw box-binder stop screw.....		
Legs, wood (3).....		
Leg sockets (3).....		
Leg-socket bolts and nuts (3).....		
Leg-socket screws, 1.5 inch, No. 20 (12).....		
Foot plates (3).....		
Foot-plate screws, 1.5 inch, No. 20 (3).....		
Foot plate calks (3).....		
Total.....		\$50.00

SPARE PARTS FOR TRIPODS.

Any of the component parts of tripod will be issued for repairs as required.

FORGE AND BATTERY WAGON.

The light artillery forge and battery wagon will be issued to gatling-gun batteries, with its full equipment of saddlers', carpenters', and wheelwrights' and blacksmiths' tools, and the full quantity of materials for cleaning and preservation and supplies. The supply of the latter contained in the forge and battery wagon as enumerated in the supply table, 3.2-inch B. L. rifle battery, constituting a full six months' supply for a gatling-gun battery.

ARTILLERY STORE WAGON.

The regulation artillery store wagon provided for 3.2-inch field batteries, with its full equipment, will be issued to gatling-gun batteries when equipped as such.

SPARE PARTS FOR FORGE AND BATTERY WAGON AND ARTILLERY STORE WAGON.

Spare parts for repairs of forge and battery wagon and artillery store wagon for gatling-gun batteries will be issued when needed as provided for 3.2-inch field batteries.

HARNESSES FOR GATLING GUN, CALIBER .30.

The harness issued for the gatling guns, caliber .30, is the regulation light artillery harness, wheel, and lead.

AMMUNITION FOR GATLING GUNS.

The service small-arms ammunition, caliber .30, is issued for use with the gatling gun, caliber .30.

The blank cartridges, caliber .30, can not be used in gatling guns of this caliber.

For allowance of ammunition for target practice per annum, see G. O.'s 99, A. G. O., 1903.

COLT AUTOMATIC GUNS, CALIBER .30.

For complete description and instructions for its use and care, see pamphlet "Description of the Colt Automatic Machine Gun, Caliber .30," published by Ordnance Department.

These guns are issued to seacoast fortifications for use in flank defense, and also to cavalry and infantry in field service, and are always, except in special or exceptional cases, issued in pairs.

The guns are provided with mounts to mount same on either field carriage or tripod, each gun being equipped with one of each.

Principal weights, dimensions, etc., of Colt automatic gun, caliber .30.

Gun	pounds..	40
Mount, with shoulder rest	do....	29.12
Tripod	do....	28
Tool bag, with contents	do....	3
Seat	do....	1.38
Tripod and mount, complete	do....	61.87
Feed box, empty	do....	2.50
Loaded belt, 250 rounds	do....	15.82
Feed box, with loaded belt	do....	18.32
Belt-loading machine	do....	13.8
Caliber	inch..	.30
Length of barrel	inches..	28
Rifling, number of grooves		4
Twist, uniform, one turn in	inches..	10
Depth of grooves	inch..	.004
Diameter of vent	do....	.075
Rate of fire (about) per minute		400

Component parts of Colt automatic gun, caliber .30.

Parts.	Price each.
Handle	
Handle lock	
Handle-lock stop	
Handle-lock stop spring	
Handle-lock stop screw	
Hammer	
Main spring	
Trigger	
Trigger spring	
Sear	
Sear spring	
Trigger and sear pin	
Bolt	
Bolt pin	
Shell extractor	

Component parts of Colt automatic gun, caliber .30—Continued.

Parts.	Price each.
Shell-extractor spring.....	
Shell-extractor pin.....	
Firing pin.....	
Firing-pin spring.....	
Firing-pin lock.....	
Carrier.....	
Carrier pin.....	
Carrier dog.....	
Carrier-dog pin.....	
Carrier-dog spring.....	
Carrier-dog plunger.....	
Gas cylinder.....	
Gas-cylinder pin.....	
Gas lever.....	
Gas-lever pin.....	
Gas-lever connection.....	
Gas-lever connection pin.....	
Gas-lever bracket.....	
Gas-lever bracket pin.....	
Gas-lever piston.....	
Gas-lever piston pin.....	
Retracting springs.....	
Retracting-spring tube, right-hand.....	
Retracting-spring tube, left-hand.....	
Retracting-spring followers.....	
Retracting-spring tube screws.....	
Retracting connection.....	
Retracting-connection pin.....	
Retracting-connection link, long.....	
Retracting-connection link, long, rivet.....	
Retracting-connection links, short.....	
Retracting-connection links, short, rivet.....	
Stock, right-hand, with escutcheon.....	
Stock, left-hand, with escutcheon.....	
Block screw.....	
Front-side plate screw.....	
Front-side plate-screw lock screw.....	
Rear-side plate screw.....	
Rear-side plate-screw lock screw.....	
Safety.....	
Safety stop. (Same as handle-lock stop.).....	
Safety-stop spring. (Same as handle-lock stop spring.).....	
Safety-stop screw. (Same as handle-lock stop screw.).....	
Belt guide.....	
Belt-guide screw.....	
Feed wheel and bushing.....	
Feed-wheel shaft.....	
Feed-wheel dog.....	
Feed-wheel dog screw.....	
Feed-wheel dog spring.....	
Feed lever.....	
Feed-lever screw.....	
Feed throw-off.....	
Feed throw-off spring.....	
Feed throw-off screw.....	
Ratchet lever.....	
Ratchet-lever screw.....	
Ratchet-lever pawl.....	
Ratchet-lever pawl spring.....	
Ratchet-lever pawl pin.....	
Ejector.....	
Chamber guide.....	
Bullet guide.....	
Bullet-guide screw.....	
Cartridge guide.....	
Cartridge extractor.....	
Cartridge-extractor pin.....	
Cartridge-extractor spring.....	
Trip.....	
Slide.....	
Slide pin.....	
Receiver.....	
Side plate, right-hand.....	
Side plate, left-hand.....	
Bottom plate.....	
Barrel.....	
Front sight.....	
Rear sight.....	
The rear sight consists of the following parts:	
Base.....	
Base screw, front.....	
Base screw, rear.....	
Base spring.....	

Component parts of Colt automatic gun, caliber .30—Continued.

Parts.	Price each.
The rear sight consists of the following parts—Continued.	
Leaf	
Leaf pin	
Slide	
Slide cap	
Slide-cap screws (2)	
Slide catch	
Slide-catch spring	
Slide-catch screw	
Total	\$400.00

The Colt automatic gun, caliber .30, will be provided with an improved rear sight graduated to 2,000 yards and provided with wind-gauge attachment.

The front sight is similar to the rifle or carbine sight, with grooves cut in the sides.

Component parts of carriage for Colt automatic gun, caliber .30.

Parts.	Price each.
Wheel	
Axle arm	
Axle washer	
Axle pinchpin	
Axle body	
Socket	
Mount clamp	
Mount-clamp stop screw	
Mount-clamp shoe	
Mount-clamp shoe stop screw	
Socket pin	
Trail	
Trail pin	
Trail handle	
Trail-handle pin	
Trail-handle bracket	
Trail-handle bracket spur	
Saddle	
Saddle bracket	
Saddle-bracket rod	
Saddle-bracket binder screw	
Saddle thumbcrew	
Large chest (1,500 cartridges)	
Small chest (500 cartridges)	
Chest bracket	
Chest-bracket pin	
Chest-bracket lock pins (4)	
Chest-bracket lock pin chains (4)	
Chest strap, upper	
Chest strap, lower	
Chest handle	
Chest-handle base	
Chest flush handle	
Chest hinge	
Chest hasp	
Chest-hasp plate	
Chest-hasp lock	
Chest steel plate	
Chest corners, back (8)	
Chest corners, front (8)	
Total	\$150.00

Component parts of mount for Colt automatic gun, caliber .30.

Parts.	Price each.
Saddle, with arc	
Yoke	
Worm	
Worm shaft	
Worm-shaft screw	
Worm-shaft screw washer	
Handwheel	
Handwheel screw	
Gun pin	
Gun-pin lock screw	
Gun-pin chain	
Gun-pin chain screw	
Axis bolt	
Axis-bolt nut	
Gun-adjusting screw	
Gun-adjusting screw nut	
Arc clamp	
Arc-clamp stop screw	
Arc-clamp shoe	
Worm cover	
Worm-cover screw	
Spindle washer	
Spindle-washer bolt	
Total	\$62.50

Component parts of tripod for Colt automatic gun, caliber .30.

Parts.	Price each.
Shoulder rest	
Shoulder-rest tube	
Shoulder-rest pin	
Shoulder-rest binder screw	
Bracket	
Mount clamp	
Mount-clamp screw	
Mount-clamp shoe	
Leg bolts (3)	
Leg-bolt nuts (3)	
Leg, long	
Leg, short (2)	
Saddle	
Saddle screw	
Saddle bracket	
Saddle-bracket clamp	
Total	\$60.00

BELT-RELOADING MACHINE.

One belt-loading machine complete is issued with each two Colt automatic guns, caliber .30.

Component parts of belt-loading machine for Colt automatic gun, caliber .30.

Parts.	Price each.
Frame	
Frame cap	
Frame-cap screws (4)	
Magazine	
Magazine screws (2)	
Magazine dowel pins (2)	
Cartridge guide	
Cartridge-guide key	
Cam	
Crank	
Crank shaft	
Crank handle	
Crank-handle pin	

Component parts of belt-loading machine for Colt automatic gun, caliber .30—Continued.

Parts.	Price each.
Crank-handle pawl	
Crank-handle pawl spring	
Crank-handle pawl pin	
Crank screw	
Upper feed wheel	
Upper feed-wheel screw	
Upper feed-wheel arm	
Upper feed-wheel arm screw	
Lower feed wheel	
Lower feed-wheel screw	
Lower feed-wheel spring	
Lower feed-wheel spring screw	
Tension spring	
Tension-spring screw	
Tension-spring hook	
Tension-spring hook screw	
Slide	
Slide connection	
Slide-connection pin	
Slide-connection screw	
Feed lever	
Feed-lever spring	
Feed-lever spring screw	
Carrier	
Carrier pin	
Carrier spring	
Carrier-spring pin	
Carrier-stop pins (2)	
Needles (2)	
Needle screws (2)	
Needle-screw washers (2)	
Needle bars (2)	
Needle-bar screws (2)	
Needle-bar slide	
Needle-bar lever	
Needle-bar lever pin	
Needle-bar lever spring	
Needle-bar lever-spring screw	
Needle-bar lever-spring dowel pin	
Belt guide	
Belt-guide screws (2)	
Belt-guide dowel pins (2)	
Belt-guide cover	
Belt-guide cover screw	
Cartridge stop	
Cartridge-stop spring	
Cartridge-stop spring screw	
Total	\$40.00

SPARE PARTS AND ACCESSORIES FOR COLT AUTOMATIC GUN.

The following spare parts and accessories are issued with each Colt automatic gun, caliber .30:

	Price each.
Spare parts:	
1 mainspring	\$0.35
1 hammer	1.00
2 firing pins .....	.45
2 firing-pin locks .....	.60
2 firing-pin springs .....	.00
1 cartridge extractor .....	.20
2 shell extractors .....	.25
2 shell-extractor pins .....	.02
2 shell-extractor springs (interchangeable) .....	.06
2 trigger springs (interchangeable) .....	.06
2 handle locks .....	.16
2 bolt pins .....	.05
2 sear springs .....	.04
2 retracting springs .....	.50
Accessories:	
1 oil can .....	.20
2 screw-drivers .....	.35
1 wiping rod in three joints .....	.00
1 operating handle .....	.15
3 drifts .....	.05
1 tool bag, leather	2.00

All spare parts are expendable, but should not be expended until actually used. They will be renewed from time to time as needed. Accessories are not expendable.

There are issued with each Colt automatic rapid-fire gun one extra (price \$20) barrel, carefully fitted and marked with the number of the gun to which it pertains. The barrels for these guns are not interchangeable.

The ammunition used with these guns is the service caliber .30 ammunition.

For allowance per annum for target practice and instruction, see table, G. O.'s 99, A. G. O., 1903.

The service blank cartridge, caliber .30, can be used.

The service ammunition belt for these guns is made to hold 120 cartridges. This belt is to be used in actual service only. Each two service belts (loaded) are contained in one feed box.

For use in target practice there are issued belts made to hold 50 cartridges each, 2 belts to each gun. (G. O. 15, A. G. O., 1902.)

The service belts are designated as short and long belts, and their use as herein provided is necessary to avoid undue heating of the gun and its rapid deterioration.

Price of cartridge belts.

120 cartridges	\$1.30
50 cartridges .....	.60
Feed boxes .....	.85

DUMMY CARTRIDGES.

Dummy cartridges for use in instruction and to test ejecting mechanism of guns are issued at the rate of 25 per gun, to be replaced as required.

CLEANING MATERIAL.

The allowance of material for cleaning and preservation per annum for each two Colt automatic guns, caliber .30, is as follows:

Articles.	Quantity.	Price each.
Sperm oil.....	1 quart.....	\$0.125
Cotton waste.....	4 pounds.....	.06
Cotton cloth.....	4 yards.....	.27
Wire brush.....	1 (on joint of rod to be screwed to wiping rod, taking place of front section when in use).	.....

PACK OUTFITS FOR COLT AUTOMATIC GATLING GUN, CALIBER .30.

A pack outfit has been designed and manufactured for issue to the service to carry the Colt automatic gun, mount, and tripod. The outfit consists of two saddles, one for the gun, mount, and tripod, tools, and accessories, and one for ammunition.

The component parts of saddles are:

Pack outfit for Colt automatic gun, caliber .30.

No.	Component parts.	Material.	Weight.	Price each.
<i>Saddle for gun and tripod pack.</i>				
2	Saddle bars	Poplar.....	Pounds.	
2	Metal yokes.....	Bronze No. 1.....	31	.....
2	Sets lead straps	Harness leather	21	.....
2	Saddle skirts.....	do.....	5	.....
2	Saddle pads.....	Collar duck No. 1.....		.....
2	Sets pad trimmings	Harness leather	154	.....
	Stuffing	Tow .....		.....
			45	.....

Pack outfit for Colt automatic gun, caliber .30—Continued.

No.	Component parts.	Material.	Weight.	Price each.
<i>Saddle for ammunition pack.</i>				
2	Saddle bars	Poplar	Pounds. 34	
2	Metal yokes and side bars	Yokes, bronze No. 1	124	
2	Saddle skirts	Bars, steel No. 1	9	
2	Saddle pads	Harness leather	164	
2	Sets pad trimmings	Cotton duck No. 1		
2	Stuffing	Harness leather		
		Tow	414	
<i>Cincha.</i>				
1	Body	Cotton duck No. 1		
2	Chapes	Harness leather	5	
1	Lacing strap	do		
2	Metal frames	Bronze No. 1		
<i>Halter bridle.</i>				
1	Headstall	Harness leather		
1	Checkrein	do	5	
1	Lead rein	do		
1	Strap	do		
1	Bit with snaps	Steel		
<i>Crupper.</i>				
1	Body	Harness leather	1	
1	Doek	do		
<i>Ammunition case.</i>				
1	Frame	Steel	9	
1	Cover	Collar leather		
<i>Ammunition case strap.</i>				
1	Body	Harness leather	1	
2	Billets	do		
<i>Gun case.</i>				
1	Body	Harness leather		
1	Cap	do	44	
1	Set straps	Collar leather		
<i>Hood for tripod.</i>				
1	Body	Bag leather		
1	Gusset	Harness leather	24	
1	Set straps	Collar leather		
<i>Blinder.</i>				
1	Body	Harness leather	14	
1	Set straps	do		
1	Block for loader	Poplar	14	

The packs are made up as follows:

No.	Parts.	Weight.	Price each.
<i>Gun and tripod pack.</i>			
1	Saddle	Pounds. 45	
1	Cincha	5	
2	Ammunition cases	5	
1	Ammunition case strap	1	
1	Gun case	44	
1	Hood for tripod	24	
1	Block for loader	14	
1	Halter bridle	5	
1	Blinder	14	
1	Crupper	1	
	Gun and tripod pack, complete	844	
	Total		\$116.12

Parts.		Weight.	Price each.
<i>Ammunition pack.</i>			
1	Saddle.....	41½	
1	Cincha.....	5	
4	Ammunition cases.....	86	
2	Ammunition case straps.....	2	
1	Halter bridle.....	5	
1	Blinder.....	1½	
Ammunition pack, complete.....		91½	
Total.....			\$144.93
Entire pack outfit.....			290.06

The ammunition boxes used for the pack saddles for this gun are the "quick-delivery ammunition boxes for small-arms ammunition."

Four boxes, holding 4,000 rounds, are carried on each saddle.

1-POUNDER (1.457 INCHES CALIBER) (POMPOM) VICKERS-MAXIM Q. F. GUNS.

For full description of these guns see "Handbook for the 1-pounder Maxim Q. F. gun," published by Ordnance Department.

These guns are issued in batteries of 2, 4, or 6 (except in special or exceptional cases) to troops of any arm of the service, each gun and limber being drawn by 6 horses.

WEIGHTS, DIMENSIONS, ETC., 1-POUNDER VICKERS-MAXIM Q. F. GUN.

Caliber, 1.457 inches.

Length:

Without shoulder piece, 73.75 inches.

With shoulder piece, 87.58 inches.

Barrel, 42 inches.

Weight (average), 410 pounds.

Weight of projectiles (common shell and steel-pointed shell):

Charge (cordite size 3.75), 1 ounce 90 grains.

2.5

Bursting charge in shells—

Common, 270 grains.

Steel, 270 grains.

Shell, 1 pound.

Cartridge case, 6 ounces.

Complete cartridge, with shell, 1 pound 7 ounces 140 grains.

Muzzle velocity, 1,800 feet per second.

Pressure in chamber of gun, 11½ tons per square inch.

Component parts of 1-pounder Vickers-Maxim Q. F. gun.

Parts.	Price each.
Lock casing.....	
Safety sear.....	
Safety-sear spring.....	
Safety-sear axis pin.....	
Firing pin.....	
Firing-pin point.....	
Side-lever axis pin.....	

Component parts of 1-pounder Vickers-Mazim Q. F. gun—Continued.

Parts.	Price each.
Tumbler.....	
Tumbler-axis pin	
Hand sear	
Hand-sear axis pin	
Lock spring	
Lifting-lever axis pin	
Hand-sear guard	
Hand-sear guard securing pin	
Carrier	
Gib	
Gib spring	
Gib shutter	
Tail spring	
Slide lever	
Connecting rod	
Crank pin	
Crank	
Crank shaft	
Recoil plate	
Barrel	
Breech packing gland	
Ejector tube	
Ejector-tube spring	
Ejector-tube spring, securing	
Borew	
Water jacket	
Lifting lever	
Inside cam	
Cam pawl	
Cam-pawl spring	
Outside plate	
Buffer block	
Buffer casing	
Buffer packing gland	
Piston	
Packing, leather	
Buffer ring	
Crossbar	
Pistol grip	
Trigger	
Indicator lever	
Trigger connector	
Trigger bar	
Trigger-bar spring	
Tangent-sight socket	
Tangent-sight clamp (carried in tool chest)	
Tangent sight (carried in tool chest)	
Fore sight	
Fore-sight bracket	
Elevating lug	
Crank handle	
Dead stop	
Roller	
Trunnion of gun	
Pin taper, securing water jacket	
Pin taper, securing buffer block	
Studs for ammunition-box bracket	
Clock-spring box	
Cover	
Cover block	
Cover pin	
Feed block	
Bottom pawls	
Top pawls	
Feed-block slide	
Top lever, feed block	
Bottom lever, feed block	
Screwed plug for filling	
Screwed plug for emptying	
Slide valve	
Barrel spring	
Muzzle stuffing box	
End cap	
Muzzle packing gland	
Barrel nut	
Pilling in piece (this piece on right side sometimes called "roller bracket")	
Tail-spring rivet	
Carrier horns	
Asbestos packing, breech	
Asbestos packing, muzzle	
Buffer cylinder	
Roller nut	
Steam-tube socket, front	
Steam-tube socket, rear	
Steam tube	

Component parts of 1-pounder Vickers-Maxim Q. F. gun—Continued.

Parts.	Price each.
Gib stop	
Screw securing gib stop	
Gib pawl, with spring	
Cover-joint pin	
Upper carrier stop	
Guides for flanges of lock	
Carrier ribs	
Gib lugs	
Clock spring	
Hook in clock-spring box	
Hook in crank shaft	
Screws securing clock-spring box	
Top-pawl axis pin	
Top-pawl spring	
Bottom-pawl axis pin	
Bottom-pawl spring	
Front-sight protector	
Shoulder rest	
Ammunition-box bracket	
Ammunition-box bracket bolts	
Ammunition-box bracket bolt nuts	
Total	\$1,690.64

SIGHTS.

These guns are provided with a front and rear sight. The front sight consists of a steel point screwed into a bracket riveted to the right side of cover. The rear is a tangent sight graduated to 3,000 yards.

AMMUNITION.

Two kinds of projectiles are furnished for these guns, the "common shell" (price \$1.756 each, including fuse), and the "steel-pointed shell" (price \$—— each, including fuse).

The ammunition is carried in ammunition belts holding 25 rounds each and fed to the gun direct from the belts.

FUSES.

Two kinds of fuses are provided for the projectiles used with the 1-pounder Vickers-Maxim guns, both being percussion fuses. The "nose fuse" is used for the common shell and the "base fuse" for the steel-pointed shell.

FIELD CARRIAGE FOR 1-POUNDER VICKERS-MAXIM Q. F. GUN.

The field carriage for the Vickers-Maxim 1-pounder (1.457-inch) (pom-pom) quick-fire gun consists of trail, elevating and traversing gears, crosshead, axle, and wheels.

Weight of carriage, — pounds.

Principal component parts are:

Parts.	Price each.
Trail:	
2 plates (steel)	
4 trail transoms (steel)	
1 trail shoe with trail eye and socket for traversing handspike (brass)	
1 trail spade (steel)	
1 traversing handspike (steel)	
2 trail handles (steel)	
2 stays, steel, for trail plate	
2 stay bolts	
2 stay-bolt nuts	
2 pins, fixing (steel, for securing stay to axle)	
1 trail bracket (gun metal)	
1 bracket fixing pin (for securing bracket and trail to axle)	
Handspike attachment, front	
Handspike attachment, rear	
Cleaning-rod attachment, front	
Cleaning-rod attachment, rear	

Parts.	Price each.
Elevating gear:	
1 inner elevating screw	
1 outer elevating screw	
1 hand wheel	
1 sleeve	
1 clamping screw and handle	
1 elevating joint pin	
1 T-head for elevating screw	
Traversing gear:	
1 traversing gear arm	
1 traversing gear-arm clamping screw	
1 traversing gear-arm clamping-screw bolt	
1 traversing gear-arm clamping-screw bolt nut	
1 steel arc	
Cross-head:	
1 crosshead (gun metal) with pivot to fit socket in bracket of trail	
1 crosshead nut	
1 crosshead-nut split pin	
2 trunnion cap squares	
4 trunnion cap-square vise screws	
Axle (solid steel)	
Wheels:	
Nave boxes (bronze)	
Nave-box bolts	
Nave-box bolt nuts	
Linchpins	
Linchpin washers	
Fellys (ash)	
Felly bolts	
Felly washers	
Felly nuts	
Spokes (oak)	
Shield	
Total	\$1,225.50

LIMBER FOR 1-POUNDER VICKERS-MAXIM Q. F. GUN.

The limber for the carriage of the 1-pounder Vickers-Maxim Q. F. gun (pom-pom) consists of a steel ammunition box on an angle-iron frame supported on two springs above the axle.

Weight of limber (with 12 empty ammunition boxes), — pounds.

Principal component parts are:

Parts.	Price each.
1 steel frame	
4 steel spring attachments	
2 steel springs	
4 spring bolts	
4 spring-bolt nuts	
1 axle, solid steel (with pole attachment)	
2 wheels (same as carriage)	
Trail box:	
Trail-box lid	
Trail-box lid hinges	
Trail-box lid-hinge pins	
Trail-box lid hasp	
Trail-box lid staple	
1 limber seat	
2 limber-seat hinges	
2 limber-seat hinge pins	
2 limber-seat guard rails	
1 limber-seat back	
2 limber-seat back bolts	
Limber-seat back-bolt nuts	
Shield wedge	
Trail eye hook	
Trail eye hook key	
Limber footboard	
Water-tank attachments	
Splinter bar	
Splinter-bar trace hooks	
Splinter-bar trace-hook eyes	
Splinter-bar drag eyes	
Splinter-bar pole bracket	
Splinter-bar pole-bracket bolts	

Parts.	Price each.
Splinter-bar pole-bracket nuts.....	\$36.94
Pole.....	
Pole neck-yoke stop.....	2.40
Pole supporting bar.....	
Pole bolt.....	6.00
2 singletrees.....	
2 water tanks.....	
Ammunition chest (steel):	
Partitions for ammunition chest.....	
Ammunition-box bolts.....	
Ammunition-box doors.....	
Ammunition-box door hinges.....	
Ammunition-box door-hinge pins.....	
Ammunition-door hasp turn-buckles.....	
Ammunition-door lock and key.....	
Ammunition-door lock chain.....	
Attachments for intrenching tools on sides of ammunition chest.....	
1 spare-part box (on footboard).....	
Total.....	764.01

EQUIPMENT FOR 1-POUNDER VICKERS-MAXIM Q. F. GUNS.

The following equipment is furnished with each gun, carriage, and limber for guns Nos. 2453 to 2464, both inclusive; carriages 4689 to 4690, both inclusive; and limbers 4681 to 4692, both inclusive:

Parts.	Price each.
On gun:	
1 front sight.....	\$2.50
1 front-sight bracket.....	1.50
1 front-sight protector with chain.....	.95
1 screw plug with chain, emptying.....	.50
1 screw plug with chain, filling.....	10.10
1 canvas cover.....	33.57
1 shoulder rest.....	24.44
1 ammunition-box bracket.....	69.50
1 tangent sight (carried in tool box on footboard of limber).....	
On carriage:	
1 traversing handspike (on side of trail).....	9.98
1 rod, cleaning (in leather tool bag side of trail).....	
1 shield.....	23.98
On limber:	
In leather hold-all.....	4.50
1 water vessel, brass.....	2.43
1 funnel.....	.27
2 tanks for water (under limber).....	5.90
Right-hand side of limber seat—	
1 ax, felling.....	2.02
1 brush, water.....	.98
1 spade.....	1.39
Left-hand side of limber seat—	
1 ax, pick.....	1.12
1 hook, bill.....	.81
1 box, grease.....	1.75
Back of limber seat—	
1 pair drag ropes.....	6.66
1 bucket, water, canvas.....	1.10
1 wire cutter.....	1.00
On footboard of limber—	
1 can reserve oil for buffer (glycerine).....	1.62
1 can for rifle oil.....	.66
1 tool box.....	30.44
Containing—	
1 hammer.....	.08
8 punches.....	.60
1 oil can.....	.27
1 screw-driver.....	.39
1 brush sponge.....	2.16
1 cleaning rod, without brush.....	11.23
1 spring balance, 50 pounds.....	.66
1 combined pin spanner.....	6.66
2 firing-pin points.....	.54
1 mainspring.....	4.33
2 pieces asbestos.....	.09
2 cup leathers.....	.45
1 trigger-bar spring.....	.16
1 rib spring.....	.59
1 rib-pawl spring.....	.14
1 safety-scar spring.....	.68
1 spring feed box, upper pawl.....	.18

Parts.	Price each.
On limber--Continued.	
On footboard of limber--Continued.	
1 tomplon	\$0.68
1 spare breech mechanism	174.82
1 tangent sight (when not on gun)	
1 canvas cover for tool box	
In ammunition chest--	
12 ammunition-belt boxes	5.50
12 ammunition belts	2.00
1 belt, filling machine, complete (with set of belt-repair tools)	12.28
1 punch	
1 die	
In trail box--	
1 linchpin .....	.87
1 washer, drag	2.29
2 ties, spare .....	.09

With guns, carriages, and limbers of numbers subsequent to those previously given the following equipment is furnished:

	Price each.
On gun:	
1 front sight	\$2.50
1 front-sight bracket	
1 front-sight protector	1.50
1 front-sight protector chain	
1 water plug, emptying .....	.95
1 water plug, emptying chain	
1 water plug, filling .....	.95
1 water plug, filling chain	
1 tangent sight (carried in tool box on limber if not on gun)	\$9.28
1 shoulder rest	\$3.57
1 ammunition-box bracket	\$8.44
1 canvas cover for gun	10.48
On carriage:	
1 shield	\$8.38
1 handspike, on side of trail	9.98
On limber:	
16 ammunition belts	2.00
2 ammunition boxes	5.50
1 water vessel, brass	2.48
1 funnel, tin .....	.27
2 tanks, water	\$3.00
1 brush, water .....	.87
1 pair drag ropes (per pair)	6.55
1 grease box, half round	1.75
1 can glycerine	1.62
1 can rifle oil .....	.68
1 felling ax	2.02
1 pick, handled	1.12
1 bill hook .....	.81
1 spade	1.20
1 belt, filling machine	12.28
1 leather hold-all	4.50
2 water buckets, canvas	
2 ammunition trays	12.00
1 tool box	\$0.44
Containing--	
1 hammer .....	.68
8 punches .....	.60
1 oil can .....	.27
1 screw-driver, large .....	.36
1 screw-driver, small .....	.65
1 brush, sponge	2.16
1 cleaning rod without brush	11.88
1 spring balance, 50 pounds .....	.68
2 combined pin spanners	5.68
1 barrel-nut spanner	4.87
1 firing pin, complete	5.45
4 firing-pin points .....	.64
1 mainspring	4.38
2 pieces asbestos .....	.09
2 cup leathers .....	.45
1 trigger-bar spring .....	.16
1 gib spring .....	.99
1 gib-pawl spring .....	.14
1 safety-sear spring .....	.68
1 spring, feed box, upper pawl .....	.18
1 tomplon .....	.98

	Price each.
On limber—Continued.	
Containing—	\$0.47
1 linchpin	2.20
1 drag washer	.00
8 spare ties	.95
1 spring, ejecting tube	2.60
1 spring, extractor, with rivets	.15
1 spring, trigger pull	.75
1 spring, side cam pawl	.75
1 spring, side plate	.95
1 spring, tangent sight	.25
1 spring, tangent-sight gib	1.50
1 monkey wrench	
1 pair cutting pliers	.50
1 box of belt strips (100)	.25
1 box of eyelets (200)	1.00
1 rawhide mallet	3.50
1 set of belt-repairing tools	.25
1 spring, feed box, bottom pawl	4.25
1 safety sear	.50
1 brass punch	2.00
1 axis pin, sear	1.25
2 axis pins, trigger	1.25
2 axis pins, tumbler	4.00
1 axis pin, lock spring	3.75
1 tumbler	174.25
1 extra mechanism	

The following spare parts are furnished for each battery of two guns, to be carried on one of the vehicles with battery:

	Price each.
1 clock spring	\$1.75
1 barrel spring	4.00
1 barrel, spare	150.00

SPARE PARTS FOR GUN, CARRIAGE, AND LIMBER, 1-POUNDER VICKERS-MAXIM Q. F. GUN.

Spare parts for gun, carriage, and limber of 1-pounder Vickers Maxim Q. F. gun (except as herein provided to be carried with battery) are issued as needed.

HARNESS FOR 1-POUNDER VICKERS-MAXIM BATTERIES.

The harness issued for use of batteries equipped with 1-pounder Vickers-Maxim Q. F. guns is the regulation light artillery harness, wheel and lead, issued to 3.2-inch field batteries.

For list of component parts and prices see page 513.

FORGE AND BATTERY WAGON AND ARTILLERY STORE WAGON.

To troops equipped as a field battery with 4 or 6 1-pounder (1.457-inch) Vickers-Maxim Q. F. guns there will be issued, to complete equipment, the regulation forge and battery wagon and artillery store wagon, as provided for 3.2-inch field battery, and fully equipped with tools and materials, as provided for such batteries. (See p. 509-510.)

CLEANING MATERIAL.

The allowance of materials for cleaning and preservation provided for and contained in the forge and battery wagon will constitute a six months' supply of such materials for a 4 or 6 gun battery of 1-pounder (1.457-inch) Vickers-Maxim guns. (See p. 509-510.)

PERSONAL EQUIPMENT.

The personal equipment of a battery equipped with the 1-pounder (1.457-inch) Vickers-Maxim guns will be that provided herein for troops of the particular arm of the service to whom such guns have been assigned, so far as same may be applicable, including such personal horse equipments only as may be required for the enlisted men enumerated in General Orders No. 134, Adjutant-General's Office, 1901.

CHAPTER XVI.

SMALL ARMS.

SPARE PARTS, AMMUNITION (SERVICE AND TARGET PRACTICE), TARGETS, TARGET MATERIAL, ETC., FOR SAME.

SMALL ARMS.

COMPONENT PARTS OF U. S. MAGAZINE RIFLE, MODELS 1896 AND 1898.

(\$7 in number, exclusive of rear sight.)

For detailed description see pamphlet, Description and Rules for the Management of the U. S. Magazine Rifle, Model 1898, and U. S. Magazine Carbine, Model 1899, published and issued by the Ordnance Department, U. S. Army.

	Price.			Price.	
	Model 1896.	Model 1898.		Model 1896.	Model 1898.
Barrel:			Hinge bar:		
Barrel.....	\$1.72	\$1.76	Hinge-bar head.....	\$0.09	\$0.10
Front-sight stud.....			Hinge-bar pin.....	.01	.01
Bolt.....	.62	.61	Lower-band.....	.13	.13
Butt plate.....	.23	.24	Lower-band pin.....	.01	.01
Butt-plate cap.....	.06	.06	Lower-band swivel.....	.06	.06
Butt-plate cap pin.....	.01	.01	Lower-band swivel screw.....	.01	.01
Butt-plate cap spring.....	.01	.01	Magazine spring.....	.06	.06
Butt-plate cap-spring screw.....	.01	.01	Main spring.....	.02	.02
Butt-plate screw, large.....	.03	.03	Receiver:		
Butt-plate screw, small.....	.01	.01	Receiver.....	3.33	2.96
Butt-swivel.....	.01	.01	Guide lip.....		
Butt-swivel pin.....	.01	.01	Guide-lip rivet.....		
Butt-swivel plate.....	.06	.06	Safety lock:		
Butt-swivel plate screws (2).....	.02	.02	Safety-lock spindle.....	.02	.02
Carrier.....	.31	.32	Safety-lock spring.....	.01	.01
Cleaning rod, 1st section.....	.07	.07	Safety-lock spring spindle.....	.01	.01
Cleaning rod, 2d and 3d sections.....	.14	.14	Safety-lock thumb piece.....	.06	.07
Cut-off.....	.11	.10	Sear:		
Cut-off spring.....	.01	.01	Sear.....	.06	.06
Cut-off spring spindle.....	.01	.01	Sear spring.....	.01	.01
Ejector.....	.06	.06	Side plate.....	.35	.34
Ejector pin.....	.01	.01	Side-plate screw.....	.01	.01
Extractor.....	.19	.20	Sleeve.....	.28	.28
Extractor pin.....	.01	.01	Stacking swivel.....	.06	.06
Extractor rivet.....	.01	.01	Stacking-swivel screw.....	.01	.01
Extractor spring.....	.03	.03	Stock.....	1.51	1.31
Firing pin:			Striker.....	.12	.12
Cocking piece.....	.15	.16	Trigger.....	.07	.07
Firing-pin rod.....	.06	.06	Trigger pin.....	.01	.01
Follower.....	.14	.15	Upper band.....	.39	.39
Follower pin.....	.01	.01	Upper-band screw.....	.02	.02
Front sight.....	.02	.02	Bayonet:		
Front-sight pin.....	.01	.01	Bayonet blade.....	.54	.60
Gate.....	.72	.67	Bayonet catch.....	.04	.05
Guard.....	.27	.28	Bayonet-catch nut.....	.02	.03
Guard screw, front.....	.02	.02	Bayonet-catch spring.....	.04	.01
Guard screw, rear.....	.02	.02	Bayonet-grip body, right.....	.02	.06
Guide lip.....	.01		Bayonet-grip body, left.....	.02	.06
Guide lip rivet.....	.01		Bayonet-grip rivets (2).....	.01	.02
Hand guard:			Bayonet-grip washers (4).....	.02	.04
Hand-guard body.....	.11	.11	Bayonet guard.....	.15	.19
Hand-guard rivets, front (2).....	.02	.02	Bayonet pommel.....	.15	.19
Hand-guard rivets, rear (2).....	.02	.02	Rear sight.....	(a)	(a)
Hand-guard spring, front.....	.01	.01			
Hand-guard spring, rear.....	.01	.01			
			Total without rear sight.....	13.04	13.18
			Total with rear sight.....	13.69	14.27

a For detail prices of rear sights, see page 585-586.

NOTE.—There are issued with rifles and carbines when originally issued 1 screw-driver for each 5 guns and 1 small-arm oiler for each gun.

All parts of the model 1896 rifle are interchangeable with the model 1898, except the receiver, stock, cut-off, and side plate. The receiver and stock are the same as the model 1898, with the exception of the bolt handle seat. The spindle of the cut-off is 0.5 inch longer, and the tenon of the side plate is 0.02 inch thinner than in the model 1898.

COMPONENT PARTS OF U. S. MAGAZINE CARBINE, MODELS 1896, 1898, AND 1899.

For detailed description see pamphlet, Description and Rules for the Management of the U. S. Magazine Rifle, Model 1898, and U. S. Magazine Carbine, Model 1899, published and issued by the Ordnance Department, U. S. Army.

Prices of component parts of U. S. magazine carbines caliber 30.

Components.	Model 1896.	Model 1898.	Model 1899.	Components.	Model 1896.	Model 1898.	Model 1899.
Band.....	\$0.26	\$0.17	\$0.17	Guard screw, rear.....	\$0.04	\$0.02	\$0.02
Band spring.....	.06	.06	.06	Guide lip.....	.01		
Barrel (including front-sightstud).....	2.29	1.54	1.61	Guide-lip rivet.....	.91		
Bolt.....	1.03	.61	.61	Hand-guard.....	.16	.10	.11
Butt plate.....	.33	.23	.24	Hand-guard rivets (2), each 1 cent.....	.02	.02	.04
Butt-plate cap.....	.06	.05	.05	Hand-guard spring.....	.01	.01	.02
Butt-plate cap pin.....	.01	.01	.01	Hinge bar.....	.02	.01	.01
Butt-plate cap spring.....		.01	.01	Hinge-bar head.....	.14	.09	.13
Butt-plate cap spring screw.....	.02	.01	.01	Magazine spring.....	.07	.05	.05
Butt-plate screw, large.....	.04	.03	.03	Main spring.....	.02	.02	.02
Butt-plate screw, small.....	.02	.01	.01	Receiver (with guide lip and rivet).....	5.02	2.88	2.90
Carrier.....	.47	.31	.32	Safety-lock spindle.....	.03	.02	.02
Cleaning rod, first section.....	.17	.07	.07	Safety-lock spring.....	.01	.01	.01
Cleaning rod, second section.....	.14	.07	.07	Safety-lock spring spindle.....	.02	.01	.02
Cocking piece.....	.22	.15	.15	Safety-lock thumb piece.....	.09	.06	.07
Cut-off.....	.17	.09	.10	Sear.....	.15	.08	.08
Cut-off spring.....	.01	.01	.01	Sear spring.....	.01	.01	.01
Cut-off spring spindle.....	.01	.01	.01	Side plate.....	.54	.33	.34
Ejector.....	.11	.05	.05	Side-plate screw.....	.01	.01	.01
Ejector pin.....	.01	.01	.01	Sleeve.....	.44	.27	.25
Extractor.....	.26	.19	.20	Stock.....	1.94	1.65	1.40
Extractor pin.....	.01	.01	.01	Striker.....	.15	.12	.12
Extractor rivet.....	.01	.01	.01	Swivel bar.....	.14	.09	
Extractor spring.....	.05	.03	.03	Swivel plate.....	.10	.07	
Firing pin.....	.08	.05	.05	Swivel-plate screw, front.....	.02	.01	
Follower.....	.22	.14	.15	Swivel-plate screw, rear.....	.02	.01	
Follower pin.....	.01	.01	.01	Swivel ring.....	.03	.02	
Front sight.....	.03	.02	.02	Trigger.....	.16	.07	.17
Front-sight pin.....	.01	.01	.01	Trigger pin.....	.01	.01	.01
Front-sight stud.....	.02			Total without rear sight.....	18.02	11.37	11.39
Gate.....	1.17	.66	.67	Total with rear sight.....	19.00	12.02	12.29
Guard.....	.44	.27	.25				
Guard screw, front.....	.03	.02	.02				

a 4 at 1 cent.

b 2 at 1 cent.

These parts differ in their construction from the rifle only in the band, band spring, barrel, and stock.

Principal dimensions and weights of the rifle and carbine.

Dimensions.	Rifle.	Carbine.
Barrel:	Inches.	Inches.
Diameter of bore.....	0.30	0.30
Exterior diameter at muzzle.....	.62	.65
Exterior diameter at breech.....	.96	.96
Length of bore.....	30	22
Length of travel of bullet in bore.....	28.239	20.739
Diameter of chamber, rear end.....	.462	.462
Diameter of chamber, front end.....	.419	.419
Diameter of neck of chamber, rear end.....	.388	.388
Diameter of neck of chamber, front end.....	.384	.384
Length of body of chamber.....	1.62	1.62
Length of shoulder of chamber.....	.164	.164
Length of neck of chamber.....	.486	.486
Length of chamber, including throat.....	2.33	2.33

Principal dimensions and weights of the rifle and carbine—Continued.

Dimensions.	Rifle.	Carbine.
Rifling:	<i>Inches.</i>	<i>Inches.</i>
Number of grooves	4	4
Twist, uniform, one turn in	10	10
Width of grooves .....	.166	.166
Width of lands .....	.0589	.0589
Depth of grooves .....	.004	.004
Height of front sight above axis of bore .....	.85	.83
Distance from top of front sight to sighting notch, leaf turned down	22.296	14.296
Distance from top of front sight to sighting notch, leaf vertical	24.656	16.666
Bayonet, length of blade	11.78	.....
Stock:		
Length with butt plate	46.06	30.06
Crook, i. e., distance from axis of bore to heel of butt	1.85	1.85
Distance from trigger to butt plate	13.37	13.37
Arm complete:		
Length, without bayonet	48.9	40.9
Length, with bayonet fixed	60.7	.....
Weights.	Rifle.	Carbine.
	<i>Pounds.</i>	<i>Pounds.</i>
Barrel	3.117	2.528
Bayonet .....	.997	.....
Butt plate .....	.277	.277
Receiver	1.397	1.397
Bolt mechanism .....	.920	.920
Magazine mechanism .....	.393	.393
Stock	1.840	1.400
Hand guard .....	.078	.054
Rear sight, with screws .....	.200	.199
Cleaning rod .....	.217	.144
Total weight of metal parts, including oiler	7.238	5.585
Total weight of arm, without bayonet	9.187	8.075
Total weight of arm, with bayonet	10.174	.....
Weight to compress main spring	a 18 to 22	a 18 to 22
Trigger pull-off	3 to 6½	3 to 6½
Bayonet scabbard .....	.47	.....
Cartridge belt, woven	1.11	1.11
Cartridge belt, woven, filled with 100 cartridges	7.437	7.437

a Changed in July, 1898, to 16 to 18 pounds.

CHANGES MADE IN THE U. S. MAGAZINE RIFLE AND CARBINE.

Since the adoption of this arm the following changes have been made by the authority of the Chief of Ordnance:

Barrel:

Muzzle rounded in model 1896.

Rear end rounded in July, 1899.

Bayonet blade: Bluing stopped, April 1, 1895.

Bayonet grip: Sanding stopped, April 12, 1899.

Bayonet grip rivets: Ends rounded, November 9, 1899.

Bayonet scabbard hook:

Oscillation limited to 100 degrees, April 17, 1897.

New pattern adopted, July 22, 1899.

Bayonet scabbard mouthpiece: Aperture for blade made rectangular, July 15, 1895.

Bolt:

About one-fourth of left side of guide rib removed, June 17, 1895.

Slot for securing stud omitted, June 29, 1895.

Length of flat surface on under side of handle increased in model 1898.

Butt plate: Thickness increased 0.04 inch, toe curved, cap hole and spring lug added in model 1898.

Butt-plate cap, cap pin, cap spring, and cap-spring screw: Added in model 1896.

Butt-plate screw, large: Head made flat in model 1896.

Carrier:

Magazine-spring lug shortened, March 4, 1895.

Arbor made perpendicular to top and shortened 0.02 inch and distance between lug and bottom side of body decreased 0.02 inch in model 1896.

Modified to hold up point of first cartridge, November 20, 1899.

Cleaning rod: Made jointed and inserted in butt of stock in model 1896.

Cocking piece:

Made of high instead of low steel, August 1, 1895.

Rear part of lug beveled and locking notch added in model 1896.

Cut-off:

Blued instead of spring tempered, July 15, 1895.

Thickness of thumb piece increased 0.015 inch, and slot for flat spring replaced by spring spindle hole, April 30, 1895.

Flattening of spindle reversed, length of spindle decreased 0.5 inch, rear upper edge of thumb piece beveled, and fillet added at junction of spindle and thumb piece in model 1896.

Thumb piece left bright December 5, 1895.

Only one side of thumb piece polished January, 1900.

Cut-off spring: Flat, replaced by spiral pattern, April 30, 1895.

Cut-off spring spindle:

Added April 30, 1895.

Length increased 0.013 inch, August 6, 1895.

Ejector pin: Head rounded and length increased, January 28, 1895.

Extractor:

Depth of extractor spring pivot hole increased 0.028 inch, September 3, 1895.

Extractor pin lug added in model 1896.

Fillet added at junction of under side of body and heel, January 25, 1896.

Extractor pin: Added in model 1896.

Extractor screw: Replaced by extractor rivet in model 1896.

Front sight stud: Width of slot reduced to 0.05 inch in model 1896.

Front sight:

Height of top above axis of bore increased from 0.82 inch to 0.85 inch, June 20, 1894.

Thickness made 0.05 inch throughout and shape of top changed in model 1896.

Height of top above axis of bore increased from 0.85 inch to 0.975 inch for use with model 1901 rear sight.

Front sight pin: Length increased and taper changed in model 1896.

Gate:

Length of lug reduced 0.0065 inch, April 1, 1895.

Fillet added at junction of lug and hinge, October 8, 1895.

Shape of exterior and interior of front end changed, October 8, 1895.

Curvature of exterior and shape of interior at rear end changed, and bevel on the front part of the interior of the top omitted in the model 1896.

Guide lip:

Tenon to enter groove in receiver omitted, September 8, 1894.

Thickness increased in model 1896.

Hand guard body: Extended rearward over tenon of receiver and heads of rivets countersunk deeper in model 1896.

Hand guard rivets, front and rear: Shortened in 1895.

Hand guard springs: Crimp omitted in model 1896.

Hinge bar head:

Rear right edge rounded, May 11, 1895.

Fillet added at junction of spring and head, June 4, 1895.

Width of lug on spring reduced 0.03 inch, January 30, 1896.

Hinge bar pin: Blued instead of spring tempered, July 15, 1895.

Mainspring:

Length increased from 30½ to 33½ coils in model 1896.

Weight reduced from 18 to 22 pounds to 16 to 18 pounds in model 1896.

Ramrod: Omitted in model 1896.

Ramrod stop: Omitted in model 1896.

Receiver:

Groove for guide lip tenon omitted, September 8, 1894.

Slot for ejector pin head omitted, January 28, 1895.

Walls of trigger heel slot omitted, May 27, 1895.

Depth of cut-off spring spindle recesses increased, October 15, 1895.

Extractor pin notch added in model 1896.

The following changes were embodied in the model 1896, viz:

Cut-off hole reduced 0.5 inch in depth and position slightly changed.

Width of mortise for side plate tenon increased 0.02 inch.

That part of the bolt handle seat projecting beyond tang omitted.

Outside of right wall over gate beveled.

Bearing for top side of carrier, in carrier arbor cavity, lowered 0.02 inch.

That part of the left wall of the magazine spring channel projecting beyond the bottom wall omitted.

Mark on side of tenon for position of barrel omitted.

Top of carrier arbor ear lowered to project only slightly above top of gate.

Bottom of magazine spring channel made parallel to bottom of magazine.

Fillet in tenon added, July, 1899.

Safety lock: Thickness of thumb piece increased; thumb piece and spindle made separate, and spring and spring spindle added in model 1896.

Safety lock spindle: Depth of safety lock pin groove in model 1892 reduced. (See sleeve.) The spindle with deep groove is known as model 1892, second pattern, and with the shallow groove as model 1892, third pattern.

Safety lock pin: Omitted in model 1896.

Sear:

Made of low instead of high steel, October 25, 1895.

Nose shortened 0.005 inch, November 26, 1895.

Sear spring: Size of wire changed from 0.041 inch to 0.047 inch, November 21, 1898.

Side plate:

Hole for ejector-pin head added, January 28, 1895.

Thickness of upper half increased and cartridge rib lengthened in model 1896.

Thickness of tenon increased 0.02 inch in model 1896.

Polishing inside stopped, November 28, 1898.

Rear upper corner rounded, May 5, 1899.

Side plate screw: Shortened in length one thread, June 1, 1894.

Sleeve:

Safety lock pin hole raised 0.03 inch, October 22, 1894.

The sleeve with low safety lock pin hole is known as model 1892, first pattern, and with high hole as model 1892, second pattern.

Securing stud and rivet omitted, June 29, 1895.

Knurling omitted, June 15, 1895.

The following changes were embodied in the model 1896, viz:

Safety lock pin hole omitted.

Front end of barrel shortened 0.0345 inch.

Thickness of extractor arm reduced 0.035 inch.

Countersink for screw head omitted and lower part of rivet hole countersunk for rivet head.

Groove with a recess at each end added for safety lock spring spindle.

Stock—changes embodied in model 1896:

Small enlarged.

Toe rounded.

Two holes, 1 inch in diameter, to decrease the weight, and three small holes for cleaning rod drilled in butt.

Oiler seat cut between large holes.

Channels cut under barrel to decrease the weight.

Ramrod groove and stop slot omitted.

Bolt handle seat changed in model 1898.

Size of cleaning rod holes changed from 0.22 inch to 0.24 inch, November 21, 1898.

Striker: Point rounded, December 2, 1895.

Trigger:

Case hardened in water instead of oil, April 2, 1894.

Case hardened in oil instead of water, November 21, 1898.

Width of sear slot changed from 0.24 inch to 0.25 inch, November 21, 1898.

Trigger pin: Length reduced 0.045 inch, November 15, 1895.

Upper band:

Middle portion over barrel removed, August 16, 1894.

Bushing for ramrod omitted in model 1896.

In the model 1898, and all rifles and carbines since made, that part of the bolt handle seat projecting beyond the exterior wall of the receiver has been omitted and the seat for the bolt handle in the stock correspondingly reduced in size.

The models 1896 and 1898 rifles have been made uniform in the operation of the cut-off, so that the magazine is "off" when the thumb piece of the cut-off is turned down. New cut-offs were manufactured and issued to take the place of the old ones in the model 1896 rifle. (See Cir. 44, A. G. O., 1899.)

All the parts of the model 1896 and model 1898 rifles are interchangeable, except the following:

Receiver.

Bolt.^a

Carrier.

Cut-off.

Gate.^a

Side plate.

Stock.

Rear-sight base screw, front.

All the parts of the model 1896 and model 1898 carbine are interchangeable, except the following:

Receiver.

Bolt.^a

Carrier.

Cut-off.

Gate.^a

Side plate.

Stock.

The model 1899 carbine differs from that of the 1898 model only in the stock, band, and hand guard. The stock of the model 1899 carbine is 2 inches longer than that of the 1898 model. The band of the model 1899 carbine is that for the cadet rifle, and is located 2½ inches nearer the muzzle than in the model 1898.

The hand guard on the model 1899 carbines has a *swell* for the protection of the rear sight instead of the sight-protector band in use on previous models. It is not interchangeable with other models.

^aThe model 1898 pattern of these parts can be used in the model 1896 arm, but the model 1896 parts can not be used with model 1898 arm.

The parts of the 1899 carbine are interchangeable with the rifle, model 1898, with the exception of the stock, the base of the rear sight, and the band.

All carbine parts are interchangeable with the corresponding rifle parts, except the following:

Band.
Band spring.
Barrel.
Front sight.
Hand guard.
Rear-sight base.
Rear-sight base screw, front.
Rear-sight leaf.
Rear-sight slide.
Rear-sight slide cap.
Stock.

REAR SIGHTS, RIFLE AND CARBINE.

Model 1902.

The rear sight, model 1902, consists of the following parts:

	Price each.		Price each.
Base		Slide	
Base screws (2)		Slide pin	
Base spring		Slide screw	
Eye-piece		Slide spring	
Eye-piece knob		Slide-spring plunger	
Eye-piece knob pin		Slide shoe	
Eye-piece screw			
Joint pin		Total	\$0.69
Leaf			

Model 1901.

The rear sight, model 1901, consists of the following parts:

	Price each.		Price each.
Fixed base	\$0.25	Leaf-slide binding-screw	\$0.01
Movable base .....	.26	Leaf-slide binding-screw pin .....	.01
Base screw, front .....	.01	Drift-slide .....	.04
Base screw, rear .....	.01	Drift-slide pin .....	.01
Base-screw washer .....	.01	Joint pin .....	.01
Base spring .....	.02	Binder .....	.06
Base-spring screw .....	.01	Binder screw .....	.01
Leaf .....	.21		
Leaf-slide body .....	.11	Total	1.09
Leaf-slide cap .....	.06		
Leaf-slide cap screw .....	.01	Total with friction spring	1.11

Model 1896.

The rear sight, model 1896, consists of the following parts:

	Price each.		Price each.
Base	\$0.24	Slide cap	\$0.08
Base screw, front .....	.01	Slide-cap screw .....	.01
Base screw, rear .....	.01	Slide spring .....	.01
Base spring .....	.04	Slide screw .....	.02
Leaf .....	.16	Slide pin .....	.01
Joint screw .....	.01		
Slide .....	.10	Total .....	.65

Model 1896 (carbine).

The rear sight model 1896 carbine consists of the following parts:

	Price each.		Price each.
Base	\$0.34	Slide pin	\$0.01
Base screw, front .....	.01	Slide screw .....	.04
Base screw, rear .....	.01	Slide spring .....	.01
Base spring .....	.06	Slide cap .....	.04
Joint screw .....	.02	Slide-cap screw .....	.01
Leaf .....	.26		
Slide .....	.15	Total .....	.98

The height of front sight above axis of bore is as follows:

Rifle—

For model 1896 rear sight, 0.85 inch.

For model 1901 rear sight, 0.975 inch.

Carbine—

For model 1896 rear sight, 0.83 inch.

For model 1901 rear sight, 0.919 inch.

The model 1896 sights are no longer issued and will be replaced on all rifles and carbines in service where practicable, or new rifles and carbines with 1901 sights issued. (G. O., No. 95, A. G. O., 1901, and G. O., No. 162, A. G. O., 1901.)

U. S. magazine rifles, caliber .30, model 1892, are no longer issued to the service. They have been replaced by models 1896 and 1898, the model 1892 rifle being converted to model 1896. It may be recognized by the stamp marks on the receiver, which are either "model 1892," "1894," or "1895," and by having the long ramrod and solid butt plate. (Cir. No. 5, A. G. O., 1901.)

U. S. magazine carbines, caliber .30, models 1896 and 1898, with short stocks and iron-protecting bands for the sights, can not be fitted with the model 1901 wind-gauge sights.

The manufacture of the model 1901 rear sight for rifle and carbine has been discontinued and the model 1902 sight substituted. The modification consists of the removal of the side notches, leaving but one central notch, and in the removal of these notches, the rounding of the eyepiece; also a change in the base spring and the binder for slide.

CLEANING RIFLES AND CARBINES.

For detailed instructions as to the cleaning and care of the rifle and carbine see pamphlet Description and Rules for the Management of the U. S. Magazine Rifle, Model 1898, and Carbine, Model 1899, published by the Ordnance Department.

SPARE PARTS FOR U. S. MAGAZINE RIFLE AND CARBINE.

Only the following component parts of and appendages for the U. S. magazine rifle and carbine, caliber .30, will be issued to the ordnance officers of posts and regiments for the purpose of making repairs to arms in the hands of troops in the field and garrison:

TABLE I.

Name of component part.	Number for each 100 arms.		Price each.			
	Rifle, models 1896 and 1898.	Carbine, models 1896 and 1899.	Rifle.		Carbine.	
			1896.	1898.	1896.	1899.
Band.....	1	3			\$0.25	\$0.17
Band spring.....	2	3			.06	.06
Bayonet, complete.....	2		\$1.19	\$1.19		
Bolt.....	2	2	.82	.61	1.08	.61
Butt plate.....	1	1	.23	.24	.83	.24
Butt-plate cap.....	2	2	.05	.05	.08	.06
Butt-plate cap pin.....	5	5	.01	.01	.01	.01
Butt-plate cap spring.....	3	3	.01	.01		.01
Butt-plate cap-spring screw.....	3	3	.01	.01	.02	.01
Butt-plate screw, large.....	2	2	.03	.03	.04	.08
Butt-plate screw, small.....	3	3	.01	.01	.02	.01
Butt-swivel plate, complete.....	1	1	.09	.08		
Carrier and follower assembled.....	2	2	.46	.48	.70	.48
Cleaning rod, first section.....	5	5	.07	.07	.17	.07
Cleaning rod, second and third sections (interchangeable).....	10	10	.14	.14	.14	.07
Cut-off.....	5	5	.11	.10	.20	.10
Ejector.....	10	10	.05	.05	.11	.05
Ejector pin.....	10	15	.01	.01	.01	.01
Extractor and sleeves assembled.....	3	3	.19	.20	.26	.20
Extractor pin.....	3	3	.01	.01	.01	.01
Extractor rivet.....	3	3	.01	.01	.01	.01
Extractor screw (used only in model 1896 rifles, altered from model 1892).....	5					
Extractor spring.....	5		.03		.05	.08
Firing pin.....	2	2	.05	.06	.08	.06
Follower.....	2	2	.14	.15	.22	.15
Follower pin.....	3	3	.01	.01	.01	.01
Front sight.....	3	3	.02	.02	.03	.02
Front-sight pin.....	3	3	.01	.01	.01	.01
Gate.....	2	2	.72	.67	1.17	.67
Guard.....	1	1	.27	.28	.44	.28
Guard screw, front.....	1	1	.02	.02	.03	.02
Guard screw, rear.....	1	1	.02	.02	.04	.02
Hand guard.....	6	6	.11	.11	.16	.11
Hinge bar.....	5	5	.01	.01	.02	.01
Lower band.....	2		.13	.13		
Lower-band pin.....	2		.01	.01		
Lower-band swivel.....	3		.05	.05		
Lower-band swivel screw.....	5		.01	.01		
Magazine spring.....	10	10	.05	.05	.07	.06
Main spring.....	3	3	.02	.02	.02	.02
Safety lock.....	4	4	.12	.11	.19	.11
Sear.....	2	2	.08	.08	.15	.08
Sear spring.....	3	3	.01	.01	.01	.01
Slide plate.....	1	1	.35	.34	.54	.34
Slide-plate screw.....	4	4	.01	.01	.01	.01
Sleeve, see extractor and sleeves assembled.....			.28	.28	.44	.28
Stacking swivel.....	5		.06	.06		
Stacking-swivel screw.....	5		.01	.01		
Stock.....	10	10	1.51	1.81	1.94	1.80
Striker.....	3	3	.12	.12	.16	.12
Trigger.....	1	1	.07	.07	.16	.07
Trigger pin.....	4	4	.01	.01	.01	.01
Upper band.....	1		.89	.89		
Upper-band screw.....	2		.02	.02		
Rear sight, model 1901.....						
Fixed base.....	Base.....	1	.24	.25	.34	.25
Movable base.....		1		.26		.26
Base screw, front.....	Base screw, front.....	10	.01	.01	.01	.01
Base screw, rear.....	Base screw, rear.....	10	.01	.01	.01	.01
Base-screw washer.....		1		.01		.01
Base spring.....	Base spring.....	3	.04	.02	.06	.02
Base-spring screw.....		4		.01		.01
Leaf.....	Leaf.....	2	.16	.21	.26	.21
Leaf-slide body.....	Leaf-slide body.....	5	.10	.11	.15	.11
Leaf-slide cap.....	Leaf-slide cap.....	5	.03	.06	.04	.06
Leaf-slide cap screw.....	Leaf-slide cap screw.....	6	.01	.01	.01	.01
Leaf-slide binding screw.....	Leaf-slide binding screw.....	4	.02	.01		.01
Leaf-slide binding-screw pin.....	Leaf-slide binding-screw pin.....	6	.01	.01		
Leaf-slide spring.....	Leaf-slids pin.....					
Drift slide.....		5		.04		.04
Drift-slide pin.....		5		.01		.01
Joint pin.....	Joint screw.....	2	.01	.01	.02	.01

TABLE I—Continued.

Name of component part.	Number for each 100 arms.		Price each.			
	Rifle, models 1896 and 1898.	Carbine, models 1896 and 1898.	Rifle.		Carbine.	
			1896.	1898.	1896.	1898.
Rear sight, model 1901—Con.						
Binder	2	2	.....	\$0.05	.....	\$0.05
Binder screw	10	10	.....	.01	.....	.01
Friction spring	2	2	.....	.02	.....	.....
Appendages:						
Screw-driver	2	2	\$0.13	.13	\$0.26	.13
Small-arm oiler	3	3	.04	.04	.....	.04
Barrack cleaning rod	5	5	.12	.12	.....	.10
Combined muzzle and front sight cover .....	.....	.....	.08	.08	.03	.08
Breech cover .....	.....	.....	.20	.20	.20	.20

All spare parts expendable.

For firing at miniature targets a special removable front sight is issued in such quantities as may be required not to exceed the number of rifles or carbines on hand in the company or troop. These sights are not expendable and are issued only to such companies or troops as have been authorized by department commanders to have practice as prescribed in Special Course "B," under the provisions of paragraph 35, G. O., 20, A. G. O., 1903. The requisition for same must state the fact that authority has been granted. The sight slips over the front sight, obviating the necessity of aiming below the bull's-eye. (G. O., 20, A. G. O., also 1903.)

The small-arm pocket oiler, having a capacity of 2 ounces, is intended for and issued for use of troops serving in the tropics. The allowance is one to each man, and for extra ones carried on hand by ordnance officers three per 100 arms, as provided for the small-arm oiler. The parts of this oiler comprise the body, neck, cap, cap-washers, and spoon. It is not expendable.

Cosmoline oil will be carried in the small-arm oilers provided for use with the .30-caliber magazine arms. (Par. 2, G. O., No. 33, A. G. O., 1897, and G. O., 51, A. G. O., 1896.)

The combined front sight and muzzle cover is issued for caliber .30 rifle. Allowance, one for each arm and three per 100 arms for extra supply by ordnance officers. The parts comprise front-sight cover, muzzle cover, pin (or hinge), and spring. The cover is not expendable.

Front-sight covers are supplied for caliber .30 magazine carbines.

Breech mechanism covers for the U. S. magazine rifle and carbine, caliber .30, are supplied upon requisition, one for each rifle and carbine. (G. O., No. 23, A. G. O., 1897.)

The number of parts per 100 arms given in table on page 587 is the maximum for 100 arms which has by experience been found necessary for ordinary repairs, and is given as a guide for officers making requisition for spare parts. (G. O., No. 10, A. G. O., 1902.)

If additional quantities are required, special requisition should be made for same, explaining fully the necessity for same. (G. O., No. 10, A. G. O., 1902.)

In making these requisitions officers should always deduct the number of parts on hand from the allowance given in the table of spare parts. (G. O., No. 10, A. G. O., 1902.)

If any of the parts of rifle or carbine not included in the list of spare parts for the rifle or carbine are broken, the arm should be returned to the armory for repairs. (G. O., No. 14, A. G. O., 1896.)

The parts of rifle or carbine designated as "assembled" or "complete" can be issued only in that form; if any of the components of these parts are required the complete parts must be called for. (G. O., No. 14, A. G. O., 1896.)

The parts of rifle or carbine referred to in previous paragraph will not be expended. Ordnance officers at posts will not turn them over except to replace losses or upon the receipt of the damaged parts which they are to replace, and will quarterly (or oftener if the accumulation is sufficient) ship the damaged parts so received, properly packed and invoiced, to the commanding officer of the Springfield Armory. (G. O., No. 14, A. G. O., 1896.)

Commanders of organizations not stationed at posts where there is an ordnance officer will themselves make requisition for necessary spare parts. Organizations stationed at posts where there is an ordnance officer will receive supply of necessary spare parts from the latter.

In making requisition for spare parts for either U. S. magazine rifles or carbines, it is imperative that the model or models for which the parts are required be stated. (G. O., No. 10, A. G. O., 1902.)

In making requisition for parts of the sight, the model of the sight, as well as the model of the arm, should be given.

Parts of model 1892 magazine rifle are no longer issued to troops for repairs.

Spare parts stolen, lost, or destroyed on account of negligence, although expended, must be charged on muster and pay rolls in accordance with existing regulations. (G. O., No. 14, A. G. O., 1896.)

Supply of spare parts must be furnished to troops leaving posts for temporary duty by the ordnance officer of posts sufficient for their needs during such absence. (G. O., No. 14, A. G. O., 1896.)

To avoid constant injury, permission should not be given the soldier or he be allowed to dismount the following parts of rifle or carbine, viz: Cut-off, extractor, front sight, lower-band swivel screw, rear sight, safety lock. Especially does this apply to rear sight, which will by such handling become worn and the closeness of fit of the parts destroyed.

Company commanders should exercise a careful supervision of all dismounting and assembling of the arm, particularly in cases where any part is injured. The authorized dismounting and assembling by soldiers described in the rules for the management of the rifle should be confined to what is necessary only for instruction, under proper supervision, or for the necessary cleaning of the arm. (G. O., No. 21, A. G. O., 1895.)

When arms are presented for inspection with view to condemnation, strict attention should be paid to paragraph 985 of the Regulations, which provides:

Public property in use will not be reported as unserviceable nor condemned by an inspector merely because worn or shabby in appearance when really strong and serviceable. (G. O., No. 74, A. G. O., 1898.)

Whenever the magazine rifles, carbines, or revolvers of companies, troops, or batteries have become much worn and in need of repairs, and the deterioration is general throughout the organization, responsible officers are authorized, with the approval of their post commanders, to submit the arms for the action of an inspector upon a separate inventory and inspection report.

Should the inspector recommend that the arms, or a portion of them, be turned in for renovation and rebrowning, responsible officers will at once make requisition for new arms for their commands, or for such a number as the inspector has recommended for renovation, and will forward with it a copy of the inventory and inspection report, and when the new arms are received the old ones will at once be turned in to the armory, arsenal, or depot from which the new ones were issued. (G. O., No. 33, A. G. O., 1900; and G. O., No. 11, A. G. O., 1903.)

Ordinary repairs can usually be made in the company or at the post with the means provided for that purpose by the Ordnance Department. When the repairs required are too extensive to be thus made, an inspector should recommend that the stores be sent to an arsenal, to be designated by the Chief of Ordnance. A certified extract from the inspection report accompanying the invoices is the officer's authority for turning them in. (A. R., 1721.)

In the absence of an inspecting officer, department commanders may direct all arms, accouterments, equipments, material for mechanical maneuvers, hydraulic jacks, targets, range finders, sights, stop watches, and all other instruments and appliances for range finding and the operation of the armament of the fortifications needing repairs, resulting from fair wear and tear, which can not be made by the means provided at the post, to be sent to such arsenal as may be designated by the Chief of Ordnance. (A. R., 1722; G. O., No. 64, A. G. O., 1903.)

Before final disposition of ordnance supplies which, from any cause, are worn-out or damaged, they will be submitted to an inspector. (A. R., 1726.)

When small arms become unserviceable and can not, under existing orders, be repaired at the post, they must be turned in to the nearest depot, and under no circumstances be broken up. (A. R., 1726.)

Arms are not to be taken apart by enlisted men except by permission of a commissioned officer. (A. R., 306.)

The beautifying or change of finish of arms is prohibited. This prohibition is not construed, however, to forbid the application of raw linseed oil to the wooden parts of arm. The use of raw linseed oil only will be permitted for this purpose. (A. R., 306.)

DUMMY CARTRIDGES, CALIBER .30.

Dummy cartridges, caliber .30, are issued for use in instruction of troops. The cartridge consists of the service shell without powder, primer with the anvil (but not loaded), and a bullet jacket without the lead core. The allowance for issue is two to each enlisted man.

This cartridge is distinguished from the service cartridge by its lightness and by three knurled rings around the body in front of the rim. A later make of these cartridges is distinguished by four radial holes bored in the case near the end. All future manufacture of these cartridges will be tinned as a distinguishing mark, instead of either the knurled rings or radial holes.

The present blank ammunition, caliber .30, will not operate in the Gatling gun, Bruce feed.

MULTIBALL CARTRIDGES.

There have been designed, and are now issued to the service, multiball cartridges of both calibers .45 and .30, the former for use in Springfield carbines issued to the service for use in guarding prisoners in lieu of shotguns previously issued for this purpose. The latter (caliber .30) are issued for use in the modern magazine rifle or carbine for use in guarding prisoners, in the absence of a supply of caliber .45 carbines for this purpose, and where the use of the service cartridge would be rendered objectionable on account of the danger to persons and property at considerable distances from the firing point. The cartridges have sufficient accuracy for effective use at 200 yards, at which range a sight elevation of 350 yards is required; at 100 yards or less, fire point blank. The allowance of the .30 caliber multiball cartridges for issue is not to exceed ten rounds per man stationed at a post, and is not subject to expenditure for target practice. (G. O., 48, A. G. O., 1903.)

REVOLVING TOOLS, ETC., FOR TARGET PRACTICE.

Special caliber .30 shells and reloading tools are issued upon requisition for gallery practice. (G. O., 99, A. G. O., 1903.) See pamphlet, *List of Tools for Reloading Caliber .30 Gallery Practice Cartridges*, etc., issued by the Ordnance Department, U. S. Army.

One set of reloading tools for caliber .30 gallery practice cartridges is issued to each company or troop upon requisition.

This set comprises the following articles:

	Price each.
1. Priming tool, without spindles.....	\$1.84
2. Primer-extracting spindle, with 6 extra pins.....	.25
3. Primer-inserting spindle.....	.15
4. Charger, hand-reloading (capacity 5 grains black powder).....	.10
5. Loading anvil.....	.20
6. Loading die.....	.25
7. Loading punch.....	.10
8. Ball mold (5 balls).....	4.75
9. Melting ladle (for lead alloy or lubricant).....	.75
10. Pouring ladle (for filling ball mold).....	.08
11. Strainer (for lubricating balls by dipping in melted Japan wax).....	.06
12. Brush wiper.....	.09
13. Brass wiping rod (for cleaning fired cases, dies, etc.).....	.13
14. Brass mouthpiece or funnel (for use with brush wiper and charger).....	.10
Box for tools.....	.80
Tools Nos. 2, 12, 13, and 14 constitute, when necessary, a separate set, in a paper box, for decapping and cleaning service caliber .30 fired cases before turning them in to Frankford Arsenal. If necessary, the case can be decapped by inserting the spindle in it and striking the butt of the latter on a bench or block, but when the priming tool is available the decapping is done with it and the spindle.	
Total.....	\$9.65

The allowance of ammunition annually for gallery practice for each company of infantry, coast artillery, or engineers, and each troop of cavalry, is material sufficient for the loading of 10,000 rounds of ammunition, as follows:

1,000 gallery cartridge cases, unprimed.

10,000 cartridge primers.

10,000 round balls, lubricated (one-fourth pound of Japan wax will lubricate 1,000 round balls).

7½ pounds small-arms powder. (G. O., 99, A. G. O., 1903.)

After the exhaustion of the supply on hand of black small-arms powder, small-arms smokeless powder will be issued for gallery practice, the charge being fixed at 5.2 grains.

Gallery practice shells, caliber .30, are not expendable.

Gallery practice shells, after being fired about 100 rounds, may be sent in lots to Frankford Arsenal for inspection and resizing. Those found serviceable will be returned. (G. O., 52, A. G. O., 1894.)

Bullet for calibers .30 and .38 ball cartridges are not issued.

The gallery practice cartridge consists of the regular service case, small lead ball, lubricated, weighing 42 grains, primer, and powder charge of 5 grains of black powder or 5.2 grains smokeless powder. Complete cartridge weighs about 232 grains.

For description of cartridge see page 54, pamphlet Description and Rules for the Management of U. S. Magazine Rifle, Model 1898, and Carbine, Model 1899, issued by the Ordnance Department, U. S. Army.

The allowance of ammunition for target practice and instruction with small arms will be published annually in general orders. (A. R., 418.)

The allowance of ammunition, loaded and blank, for target practice and instruction with small arms, will be on the basis of a definite number of rounds per man per annum for all arms of the service, for both loaded and blank ammunition, instead of a money value of ammunition. (G. O., 99, A. G. O., 1903.)

The present allowance of loaded and blank ammunition is fixed by G. O., 99, A. G. O., 1903, as follows:

Officers and troops.	Kind of ammunition (rounds per man).			
	Rifle and carbine ball, caliber .30.	Revolver ball, caliber .38 or .45.	Rifle and carbine blank, caliber .30.	Revolver blank, caliber .38 or .45.
Infantry troops	400	.....	75	.....
Cavalry troops	400	200	80	160
Coast artillery troops	150	.....	55	.....
Engineer troops, mounted	400	200	80	160
Engineer troops	400	.....	60	.....
Field artillery troops .....	.....	250	.....	75
Infantry officers .....	.....	250	.....	75
Cavalry officers .....	.....	250	.....	75
Coast artillery officers .....	.....	250	.....	75
Engineer officers .....	.....	250	.....	75
Field artillery officers .....	.....	250	.....	75
Bands (infantry, cavalry, etc., if mounted) ..	250	250	80	160
Bands, not mounted, for arms with which equipped	250	250	75	75

SCHOOLS OF INSTRUCTION, ALLOWANCE PER ANNUM.^a

Infantry and Cavalry School .....	.....	100,000	.....
Cavalry and Light Artillery School .....	.....	32,000	.....

^a In addition to regular allowance.

With reference to the allowance of ammunition for practice firing, Indian scouts are on the same footing as regular troops. (Par. 779, F. R. S. A.)

Arms and ammunition for target practice are not furnished to acting assistant surgeons of the Army.

Each company or troop will be given, in addition to the allowance in table, 110 rounds of caliber .30 rifle or carbine ball cartridges for each 1,000 empty shells, caliber .30, and 115 rounds of caliber .38 revolver ball cartridges for each 1,000 empty shells, caliber .38, turned in.

All empty shells will be promptly turned in to the acting ordnance officer of the nearest post immediately upon completion of target practice, first carrying out the instructions for treatment of shells as provided by instructions published in General Orders, No. 99, A. G. O., 1903.

The acting ordnance officer of the post will, upon the accumulation of convenient lots of such shells, pack them in ammunition boxes and ship to the commanding officer, Frankford Arsenal, in time to reach that arsenal before the close of the third quarter of the fiscal year, if possible; at which time report will be made to the Chief of Ordnance from the arsenal of the number of shells to be credited to each company or troop. Upon receipt of this report the company or troop commander will be notified of the additional allowance of ammunition due him, which allowance will be available for the next target year.

The post ordnance officer will notify the commanding officer, Frankford Arsenal, at the time of shipment of the name of company or troop turning in shells, and this name will be clearly marked on the inside of the lid of the ammunition box containing the shells. (G. O., No. 99, A. G. O., 1903.)

The allowance of ammunition for all target practice will, after July 1, 1902, be for the fiscal year instead of continuing through the calendar year, as now provided. (G. O., No. 62, A. G. O., 1902.)

The value of small arms ammunition and of the component parts thereof will be published annually in general orders. (A. R., 418.)

The dropping from returns of any ball or blank ammunition until the same has been actually expended is prohibited.

The following are the present prices of small-arms ammunition:

Designation.	Date of last drawing.	Present price per 1,000 rounds.
Caliber .30 cartridges (for rifle or carbine):		
Ball (smokeless).....	May 2, 1898.....	\$24.00
Ball (smokeless), reduced range.....		21.50
Blank (smokeless).....	Plate XLII (no date).....	17.00
Blank (black powder, for Gatling guns only).....		18.00
Dummy.....		19.50
Caliber .30 cartridges (for U. S. magazine rifle, model 1903):		
Ball (smokeless).....		30.00
Blank (smokeless).....		22.50
Dummy.....		25.00
Multi-ball cartridges (smokeless).....		30.00
Multi-ball cartridges (smokeless), 1903 rifle ..		26.00
Round ball cartridges:		
For gallery practice (smokeless).....		16.00
For gallery practice (black)		15.00
Caliber .45 cartridges:		
Rifle ball (black).....	April 13, 1898.....	18.50
Rifle blank (black).....	August 24, 1898.....	15.75
Rifle ball (smokeless).....	April 13, 1898.....	22.00
Carbine ball (black).....	November 26, 1896, Pl. XIV. {	17.00
Carbine blank (black).....		15.75
Blank (black powder), for Gatling guns only ..		19.50
Multi-ball cartridges for carbine		18.75
Dummy cartridges, rifle ball.....		22.00
Revolver ball (black).....	December 4, 1896 {	12.50
Revolver blank (black).....		10.58
Caliber .38 cartridges:		
Revolver ball (smokeless).....	August 23, 1900..... {	9.50
Revolver blank (smokeless).....		8.25
Revolver ball, Colt's automatic pistol (smokeless).....		14.00
Revolver ball Luger, automatic pistol.....		17.50
Caliber .45 cartridges:		
Revolver ball (black).....		12.50
Revolver blank (black).....		6.75

NOTE.—These prices are subject to change, due to variation in price of materials and labor and modification in the process of manufacture.

REDUCED RANGE CARTRIDGES.

A reduced range cartridge for use at posts where ranges for longer distances are not available on account of danger of stray bullets has been designed.

This cartridge is designed to obtain a range of 300 yards with 1,000 yards elevation and a muzzle velocity of 900 feet per second. The reduced ranges corresponding to 1,000, 800, 600, and 500 yards have upon test been found to be 300, 204, 125, and 89 yards, respectively.

The cartridges, caliber .30, for reduced range practice will be nicked over half their length to distinguish them from the service cartridge with full charge. The cost of this ammunition is \$21.50 per thousand.

Special silhouettes for targets for use with this reduced range ammunition have been provided, and the scores made by expert marksmen correspond with sufficient closeness to those made by the same men with service ammunition at full range.

Officers should see that their commands are at all times completely equipped with ordnance and ordnance stores, and make timely requisition on the Ordnance Department for such arms, ammunition, and equipments as are required. (G. O., No. 83, A. G. O., 1899.)

The reserve small-arms ammunition per arm to be kept on hand at all times is:

200 rounds of rifle or carbine ball cartridges.

50 rounds of revolver ball cartridges. (G. O., No. 83, A. G. O., 1899.)

Expendable supplies should be asked for January 1 and July 1 in such quantities as are required, not exceeding the prescribed allowances, unless circumstances demand extra issues, in which case the reasons therefor should be plainly stated. (G. O., No. 83, A. G. O., 1899.)

The acting ordnance officer of each regiment and post will be provided with a special kit of tools for use in making repairs to rifle or carbine. The kit is composed of the following:

	Price each.
1 Pein hammer.....	\$0.35
3 screw-drivers, Nos. 1, 2, and 3.....	c. 40
1 assembling tool.....	.19
7 punches, 1 No. 1, 1 No. 2, 1 No. 3, 2 No. 4, and 2 No. 5.....	.08
1 assembling tool with anvil.....	.61
1 box for tools.....	.60
Total.....	\$2.50

^a For three.

For use in guarding prisoners the Springfield carbines, caliber .45, with the necessary supply of multiball cartridges will be issued.

The aggregate allowance of ammunition for any company will be expended at such times during the year as the department commander may direct, or in absence of specific directions as the post and company commanders may determine. When not used in target practice ammunition may, in the discretion of the post and company commanders, be expended in hunting. (A. R., 419.)

Company commanders will keep a permanent record for each calendar year of the ammunition expended in target firing at each practice. Any expenditure in excess of authorized allowances will be charged to the officer accountable. Ammunition not expended at the end of the calendar year will be no longer available. (A. R., 420.)

Where hunting for large game is practicable the men will be encouraged to hunt, and for this purpose company commanders may permit their men to purchase cartridges, if supply warrants it, such sales to be accounted for on returns of ordnance. (A. R., 422.)

The issue or sale of arms, ammunition, or other ordnance stores to Indians not in the military service, or to Indian agents, will not be made except by the special authority of the Secretary of War. (A. R., 1709.)

Civilian employees of the War Department may be armed when necessary for the protection of life or public property, and the same responsibility attaches to the officers accountable for the arms furnished them that attaches to those accountable for the arms in the hands of enlisted men. The sale of ammunition to civilians belonging to exploring or surveying expeditions authorized by law, and to civilian employees of the War Department, may be made for hunting purposes when considered necessary for their subsistence or for the interest of the United States. In the field the sale of meat cans, canteens, knives, forks, and spoons, when they can be spared, to an officer in charge of civilian employees for their use, is authorized, provided they can not be obtained in any other way. (A. R. 1711, G. O. 64, A. G. O., 1903.)

Ammunition will only be expended in action, in defense of life or public property, in target practice, in preliminary instruction of the soldier, in hunting, and for attending salutes. (A. R., 1713.)

The officer's certificate as to the necessity for all expenditures of ammunition must accompany his property return, and when ammunition is dropped from his return as "expended in action by civilian employees," a statement giving the place, date, and attending circumstances sufficiently in detail to insure verification must be filed with the return. (A. R., 1714.)

Ammunition expended by a soldier without orders or not in the line of duty, or which may be damaged or lost through his neglect, will be charged to him. (A. R., 1715.)

When ammunition is furnished civilian employees it is not to be dropped from the returns unless expended in action, or in hunting, when necessary to obtain subsistence. Ammunition not so expended will be returned to the responsible officer and accounted for by him, or paid for at the price fixed. (A. R., 1716.)

Officers and men will be permitted to purchase from the United States such cartridges as they desire for rifle practice in excess of company allowance. (Par. 781, F. R. S. A.)

In rendering ordnance returns officers should give the models of all arms on hand, reporting each model under a separate heading. This information is very essential and must not be omitted.

U. S. magazine rifles are issued to recruiting stations for instruction of recruits, one to each station and substation, upon the requisition of the officer in charge of such stations.

Ordnance officers at posts will issue to officers in charge of bands or of company musicians, upon their requisitions, rifles or carbines, according to the arm of the service, and ammunition and equipments therefor, to be kept in the barracks for use in case of emergencies. (G. O., 60, A. G. O., 1895.)

Revolvers or other available firearms will be issued to members of the Hospital Corps when detailed for service in the field during Indian wars or when left with the sick or wounded under circumstances which justify the expectation that their rights as noncombatants under the Geneva Convention will not be recognized. With these exceptions, no side arms will be issued to the members of the Hospital Corps. (Circular 2, A. G. O., 1896.)

In quarters arms will be kept in racks; bayonets in their scabbards. (A. R., 298.)

Civilian employees of the War Department may be armed when necessary for the protection of life or public property, and the same responsibility attaches to the officers accountable for the arms furnished them that attaches to those accountable for the arms in the hands of enlisted men. (A. R., 1710.)

Arms lost, destroyed, or embezzled by civilian employees will be charged in the same manner as stores similarly lost by enlisted men. A certified statement of the fact will be made in duplicate, and the money accounted for to the Ordnance Department. One copy of the statement is filed with the return. (A. R., 1712.)

Rifles, caliber .45, may be purchased for hunting purposes, not to exceed three to a company, out of company funds, under paragraph 331, A. R., by troops stationed in a country where large game exists. Officers may purchase for their own use, under paragraph 1704, A. R. These are not to be disposed of by sale or otherwise, except to other companies or to officers, the object being to confine them to the military service. (Decision Secretary of War, Oct. 30, 1894.)

The U. S. magazine rifle, caliber .30, and the U. S. magazine carbine, caliber .30, are not for sale by the Government. The cost of the arms varying from time to time, account of cost of material and labor, and changes in construction, reference should be had to the price lists published from time to time by the Ordnance Department for the prices at which these arms will be charged against men who lose, injure, or destroy them through neglect or carelessness.

Packing and transportation of arms, see packing and transportation of ordnance property, page 645.

UNITED STATES MAGAZINE RIFLE CALIBER .30.

Model 1903.

For complete description see "Pamphlet Description and Rules for the Management of the United States Magazine Rifle, model 1903, caliber .30."

The component parts of the rifle are 88 in number, as follows:

Barrel:

Barrel.
Front sight stud.
Front sight stud pin.
Rear sight base.
Base pin.
Base spline.

Bolt:

Bolt.
Extractor collar.

Bolt stop:

Bolt stop pin.
Bolt stop spring.
Butt plate.
Butt plate cap.
Butt plate cap pin.
Butt plate cap spring.
Butt plate cap spring screw.
Butt plate screw, large.
Butt plate screw, small.
Butt swivel.
Butt swivel pin.
Butt swivel plate.
Butt swivel plate screws (2).
Cut-off.
Cut-off spindle.
Cut-off spindle screw.
Cut-off spring.
Cut-off spring spindle.
Ejector.
Ejector pin.
Extractor.

Firing pin:

Cocking piece.
Firing pin rod.

Firing pin sleeve.**Follower.**

Front sight.
Front sight pin.
Floor plate.
Floor plate catch.
Floor plate catch pin.
Floor plate catch spring guard.
Guard screw, front.
Guard screw, rear.
Guard screw bushing.

Hand guard:

Hand guard body.
Hand guard rivets (2).
Hand guard spring.

Lower band.

Lower band spring.
Lower band swivel.
Lower band swivel screw.
Magazine spring.
Main spring.

Rear sight:

Base spring.
Eye piece.
Eye piece knob.
Eye piece knob pin.
Eye piece screw.
Joint pin.
Leaf.
Slide.
Slide pin.
Slide screw.
Slide spring.
Slide spring plunger.
Slide shoe.

Receiver.

Rod bayonet.
Rod bayonet catch.
Rod bayonet catch spring.
Rod bayonet stud.

Safety lock:

Safety-lock spindle.
Safety lock thumb piece.

Sear.

Sear joint pin.
Sear spring.
Sleeve.
Sleeve lock.
Sleeve lock pin.
Sleeve lock spring.
Stacking swivel.
Stacking swivel screw.
Stock.
Stricker.
Trigger.
Trigger pin.
Upper band.

The following appendages will be issued with this gun:

1 oiler and thong case (carried in the butt of the gun), one end to be filled with oil, the other to hold the thong and brush used for cleaning bore of the rifle. The oil is to be used for the lubrication of working parts only.

1 barrack cleaning rod.

1 front sight and muzzle cover.

1 screw-driver.

The following component parts only will be issued for repairs of arms in the hands of troops:

Bolt, with extractor collar.

Bolt stop.

Butt plate.

Butt plate cap.

Butt plate cap pin.

Butt plate cap spring.

Butt plate cap spring screw.

Butt plate screw, large.

Butt plate screw, small.

Butt swivel, complete.

Cocking piece, with firing pin rod.

Cut-off.

Cut-off spring.

Cut-off spring spindle.

Cut-off spindle.

Cut-off spindle screw.

Ejector.

Ejector pin.

Extractor.

Firing pin sleeve.

Follower.

Front sight.

Front sight pin.

Floor plate.

Floor plate catch.

Floor plate catch pin.

Floor plate catch spring.

Guard.

Guard screw, front.

Guard screw, rear.

Guard screw bushing.

Hand guard, complete.

Lower band.

Lower band spring.

Lower band swivel.

Lower band swivel screw.

Magazine spring.

Main spring.

Rear sight base spring.

Rear sight leaf, with eyepiece, complete.

Rear sight slide with shoe, riveted.

Rear sight slide screw.

Rear sight slide pin.

Rear sight slide spring.

Rear sight slide spring plunger.

Rear sight joint pin.

Rod bayonet.

Rod bayonet catch.

Rod bayonet catch spring.

Rod bayonet stud.

Safety lock, complete.

Sear.

Sear joint pin.

Sear spring.

Sleeve, with lock, lock pin and lock spring, complete, or separately.

Stacking swivel.

Stacking swivel screw.

Stock.

Striker.

Trigger.

Trigger pin.

Upper band.

The allowance of these parts, as well as the appendages for the issue to the service, as well as the price of same, has not yet been determined.

The following parts are the most liable to require repair:

Bolt stop: Worn by continual contact with bolt.

Cocking piece: Nose worn from neglect to keep it lubricated.

Lower band swivel and screw: Screw, if not riveted, works loose, and, with swivel, is lost.

Stock: Bruises, cuts, pieces chipped from different points, broken at small.

Striker: Point burned by defective cartridge.

The following parts (except when repairs are needed) will constantly be injured if allowed to be dismounted by the soldier for cleaning; and when repairs are neces-

sary they should be removed only by a company artificer, or some one familiar with the handling of tools and delicate mechanisms, viz: Bolt stop, cut-off, sleeve lock, front sight, lower band, and stacking swivel screws.

The removal from the barrel of the front sight stud, rear sight base, or receiver, should never be attempted except by competent workmen in armories fully equipped with the necessary tools and appliances.

The extractor collar should not be removed unless the proper tools are at hand to replace it.

The use of the rod bayonet in cleaning the bore is prohibited.

The barrel should never be unscrewed from the receiver.

The rear sight leave should never be removed from the base except for the purpose of making repairs.

Principal dimensions and weights of United States magazine rifle, model of 1903.

Dimensions.	Inches.
Barrel:	
Diameter of bore.....	0.30
Exterior diameter at muzzle.....	.6455
Exterior diameter at breech.....	1.14
Length of bore.....	28.990
Length of travel of bullet in bore.....	31.402
Diameter of chamber, rear end.....	.4716
Diameter of chamber, front end.....	.442
Diameter of neck of chamber, rear end.....	.3425
Diameter of neck of chamber, front end.....	.3405
Length of body of chamber.....	1.798
Length of shoulder of chamber.....	.16
Length of neck of chamber.....	.46
Length of chamber, including throat.....	2.498
Rifling:	
Number of grooves.....	4
Twist, uniform, one turn in.....	10
Width of grooves.....	.1767
Width of lands.....	.0569
Depth of grooves.....	.004
Height of front sight above axis of bore.....	1.052
Distance from top of front sight to sighting notch, leaf turned down.....	23.32
Stock:	
Length with butt plate.....	41.22
Crook, i. e., distance from axis of bore to heel of butt.....	2.089
Distance from trigger to butt plate.....	12.742
Length of gun complete.....	43.43
Weights.	Pounds.
Barrel	2.812
Barrel, with rear sight base and front sight stud.....	3
Butt plate.....	.250
Receiver.....	.938
Bolt mechanism.....	1
Magazine and trigger guard.....	.438
Magazine mechanism, including floor plate.....	.156
Rod bayonet.....	.375
Stock.....	1.562
Hand guard.....	.125
Front and rear bands, including swivels.....	.125
Rear sight.....	.312
Total weight of metal parts, including oiler.....	7.250
Total weight of arm.....	8.987
Weight to compress main spring.....	16 to 18
Trigger pull (measured at middle point of bow of trigger).....	8 to 44

MISCELLANEOUS DATA.

Initial velocity.....	2,300 feet per second
Powder pressure in chamber.....	about 49,000 pounds per square inch
Weight of ball cartridge.....	about 450 grains
Weight of bullet.....	220 grains
Weight of powder charge.....	424 to 444 grains

REVOLVERS.

COLT DOUBLE-ACTION REVOLVERS, CALIBER .38, MODELS 1894 AND 1896.

For further and more detailed description, instructions, operation of parts, etc., see pamphlet Description of Colt's Double-Action Revolver, Army Models 1894 and 1896, etc., published by the Ordnance Department, U. S. A.

Component parts.	Price each.	Component parts.	Price each.
Barrel	\$1.00	Latch	\$0.50
Butt swivel		Latch pin .....	.01
Butt swivel pin		Latch spring .....	.02
Crane	1.00	Locking lever (trigger) .....	.10
Crane bushing .....	.08	Locking-lever screw (trigger) .....	.08
Crane lock .....	.15	Mainspring .....	.80
Crane-lock screw .....	.07	Mainspring tension screw .....	.03
Cylinder	1.10	Rebound lever .....	.20
Cylinder bolt .....	.20	Rebound-lever arm pin .....	.01
Cylinder-bolt spring .....	.05	Rebound-lever pin .....	.05
Ejector .....	.50	Rebound-lever spring .....	.22
Ejector rod .....	.20	Rebound-lever spring pin .....	.03
Ejector-rod head .....	.10	Recoil plate .....	.05
Ejector spring .....	.10	Screw-driver .....	.10
Escutcheon, plain .....	.05	Slide plate (frame cap) .....	.50
Escutcheon, threaded .....	.05	Slide-plate screw (frame cap) .....	.05
Frame	1.90	Sight	
Hammer .....	.80	Stock, right .....	.15
Hammer pin .....	.04	Stock, left .....	.15
Hammer stirrup .....	.14	Stock pin .....	.01
Hammer-stirrup pin .....	.02	Stock screw .....	.05
Hammer strut .....	.08	Trigger .....	.80
Hammer-strut pin .....	.02	Trigger pin .....	.01
Hammer-strut spring .....	.05		
Hand .....	.20	Total	11.00
Hand spring .....	.05		

DIMENSIONS.

Weight, 2 pounds 1 ounce.

Total length, 11.5 inches.

Barrel:

Length, 6 inches.

Diameter of bore, 0.363 inch.

Rifling, number of grooves, 6.

Grooves:

Width, 0.156 inch.

Depth, 0.003 inch.

Twist, one turn in, 16 inches.

Lands, width, 0.03406 inch.

Cylinder:

Length, 1.499 inches.

Diameter, 1.52 inches.

Chambers:

Number, 6.

Diameter, 0.3825 inch.

Front sight, height above axis of bore, 0.6045 inch.

COLT DOUBLE-ACTION REVOLVER, CALIBER .38, MODEL 1901.

This revolver differs from the models 1894 and 1896 revolvers only in that it is provided with a swivel. There should be added to list of parts of the 1894 and 1896 models to make the complete list of the 1901 model the following:

Swivel ring, and

Swivel stud.

Colt double-action revolver, caliber .45, is no longer issued to the service, the Colt caliber .38 revolver being the standard service revolver. Caliber .45 revolvers are issued to the militia only.

Bullets for caliber .38 ball cartridges are not issued.

For allowance of revolver ammunition, ball and blank, for target practice and instruction, see Table of Allowance, page 592.

Revolvers will be supplied as side arms for company musicians when they take the field. (G. O., No. 60, A. G. O., 1895.)

Revolvers are issued to Hospital Corps men under certain conditions. (Cir. 2, A. G. O., 1896.) Also see page 595 relative to other arms.

The revolver will not be considered part of the foot surgeon's equipment, but will be kept on hand by company commanders for use when necessary on special occasions. (G. O., No. 69, A. G. O., 1896.)

Caliber .38 revolvers, when worn by company sergeants, are carried in holsters worn on the cartridge belt.

Revolvers are not supplied to posts.

Reloading tools for revolvers are not issued.

The two revolvers for the use of company musicians in the field should be issued to company commanders on requisition, and retained by them in the storerooms of the barracks for use when ordered into the field.

Lanyards (braided russet leather with metal snap) are issued with the model 1901 revolvers when called for. (Price each, \$1.72.)

Officers serving with troops may draw for their personal use from stores belonging to the command with which they are serving, one regulation rifle or carbine, and one revolver, with the appropriate equipments, and the usual quantity of ammunition for each arm. This ordnance property may be used in action or target practice, and will be accounted for on quarterly returns to the Chief of Ordnance. (A. R., 1706.)

Colt army revolver, caliber .45.

[Issued to militia only.]

Component parts.	Price each.	Component parts.	Price each.
Back strap	\$0.30	Guard screws (2), long	\$0.01
Back-strap screws (3) .....	.01	Hammer .....	.55
Barrel	1.60	Hammer cam .....	.01
Center pin .....	.18	Hammer roll .....	.02
Center-pin bushing .....	.20	Hammer-roll rivet .....	.01
Center-pin screw .....	.02	Hammer screw .....	.05
Cylinder	1.60	Hand .....	.10
Ejector head .....	.25	Handspring .....	.02
Ejector rod .....	.17	Mainspring .....	.19
Ejector spring .....	.07	Mainspring screw .....	.02
Ejector tube	1.05	Recoil plate .....	.05
Ejector-tube screw .....	.02	Sear and bolt spring .....	.02
Firing pin .....	.05	Sear and bolt-spring screw .....	.02
Firing-pin rivet .....	.01	Stock .....	.85
Frame	4.10	Bolt .....	.10
Front sight .....	.05	Bolt screw .....	.02
Gate .....	.55	Trigger .....	.10
Gate catch .....	.01	Trigger screw .....	.04
Gate-catch screw .....	.01	Screw-driver .....	.10
Gate spring .....	.01		
Guard .....	.50		
Guard screw, short .....	.02		
		Total	11.00

PRINCIPAL DIMENSIONS.

Total length, 12.5 inches.

Length of barrel, 5.5 inches.

Diameter of bore, 0.445 inch.

Grooves, number of, 6.

Grooves, kinds of: The grooves are flat, two-tenths inch (0.2") wide at the bottom, and are tangent to the bore along their middle lines. The lands are narrower than the grooves, being from three-hundredths inch (0.03") to thirty-three thousandths inch (0.033") wide.

Grooves, depth of, 0.005 inch.

Grooves, depth, uniform.

Grooves, twist of, one turn in 16 inches.

Grooves, twist, left-handed.

Grooves, twist, kind of, uniform.

Chambers, number of, 6.

Chambers, diameter of, 0.485, 0.482, 0.450 inch.

Cylinder, length of, 1.608 inches.

Cylinder, diameter of, 1.65 inches.

Front sight, top to axis of bore, 0.8225 inch.

WEIGHTS.

Total weights, 2.31 pounds.

Weight of powder charge, 28 grains.

Weight of bullet, 230 grains.

The Colt double-action caliber .45 revolver, some of which have been issued to the militia, will not fire the service ammunition used with the single-action revolver of the same caliber. To meet the requirement that the double-action revolver shall fire this ammunition, a large quantity of which is on hand, the following changes have been made in this arm:

1. The stirrup shortened.
2. The nose of the hammer made longer and sharper.
3. The mainspring strengthened.

Smith & Wesson revolvers, caliber .38.

Component parts.	Price each.	Component parts.	Price each.
Frame	\$2.75	Bolt spring stud	\$0.06
Slide plate .....	.15	Bolt stud screw .....	.06
Barrel	1.00	Yoke screw .....	.06
Yoke .....	.60	Slide-plate screw (long) .....	.06
Cylinder	1.75	Frame lug .....	.06
Hammer .....	.50	Mainspring .....	.20
Trigger .....	.25	Extractor rod .....	.10
Extractor .....	.25	Extractor spring .....	.06
Trigger lever .....	.10	Trigger spring .....	.15
Hand .....	.20	Bolt .....	.25
Rebound lever .....	.10	Frame pin .....	.06
Bolt thumb piece .....	.20	Center-pin spring .....	.06
Extractor-rod knob .....	.06	Center pin .....	.06
Sear .....	.10	Stock screw .....	.06
Cylinder stop .....	.25	Hammer stud .....	.10
Slide-plate screw (short) .....	.06	Cylinder-stop stud .....	.06
Bolt thumb-piece nut .....	.06	Trigger stud .....	.06
Sear spring .....	.06	Trigger-lever stud .....	.06
Stirrup .....	.10	Right-hand stock .....	.20
Yoke stud .....	.06	Left-hand stock .....	.20
Strain screw .....	.06	Screw-driver .....	.50
Hand lever .....	.10	Cleaning rod .....	.06
Yoke-stop spring .....	.06		
Bolt spring .....	.06	Total	11.25
Sear spring .....	.06		

The Smith & Wesson revolvers, caliber .38, are provided with a swivel. They have been issued to the militia only. Lanyards are furnished for this revolver when called for.

SPARE PARTS FOR CALIBER .38 REVOLVER.

Only the following component parts of and appendages for the Colt caliber .38 service revolver will be issued to the ordnance officers of the posts and regiments for the purpose of making repairs to revolvers in the hands of troops in the field and garrisons.

For Colt revolver, caliber .38.

Name of component part.	Number for each 100 revolvers.	Price each.
Crane lock	5	\$0.15
Crane-lock screw	10	.07
Cylinder bolt with spring assembled	5	.25
Cylinder-bolt spring	10	.05
Ejector-rod head	10	.10
Hammer with strut, strut pin, and strut spring, assembled	5	.95
Hammer stirrup	5	.14
Hammer stirrup pin	5	.02
Hammer strut spring	10	.05
Hand spring	10	.03
Latch pin	5	.01
Latch spring	10	.02
Locking lever	5	.10
Locking lever screw	5	.03
Mainspring	5	.30
Mainspring tension screw	5	.03
Rebound lever	5	.30
Rebound-lever spring	5	.22
Rebound-lever spring pin	5	.03
Slide-plate screw	20	.05
Stock, right } includes escutcheons plain and threaded {	10	.25
Stock, left }	10	.25
Stock screw	5	.05
Trigger (includes rebound lever arm pin)	10	.40
Appendages: screw-driver	20	.10

(G. O., No. 10, A. G. O., 1902.)

The following parts of Colt revolver, caliber .38, are issued only to ordnance depots:

	Price each.
Crane bushing	\$0.05
Cylinder	1.10
Ejector rod .....	.20
Ejector spring .....	.10
Hammer pin .....	.04
Hand and spring assembled .....	.23
Rebound lever pin .....	.05
Recoil plate .....	.05
Stock pin .....	.01
Trigger pin .....	.01

Ordnance depots should be provided with a gauge to determine the space between the cylinder and barrel, and a range rod to test the alignment of the barrel and cylinder, and a punch and set for replacing recoil plates. (G. O., No. 10, A. G. O., 1902.)

Officers in charge of ordnance depots should always keep on hand a reasonable supply of the above spare parts, making timely requisition for same. The following list is published as a guide for a maximum year's supply:

Crane bushings	25
Cylinders	25
Ejector rods	25
Ejector springs	50
Hammer pins	50

Hand and spring assembled.....	25
Rebound lever pins.....	50
Recoil plates.....	50
Stock pins.....	50
Trigger pins.....	50

The following parts of Colt revolver, caliber .38, are not issued:

	Price each.
Barrel.....	\$1.00
Crane.....	1.00
Ejector.....	.50
Frame.....	1.00
Latch.....	.50
Side plate.....	.50
Sight.....	.50

When any of these parts become damaged, the revolver should be turned into Springfield Armory for repair. (G. O., No. 10, A. G. O., 1902.)

The number of spare parts per 100 arms given in tables is the maximum for 100 arms, and is a guide for officers in making requisitions. For additional quantities special requisition should be made, explaining fully the necessity for same, etc. (G. O., No. 10, A. G. O., 1902.)

The number of spare parts on hand should always be deducted from the allowance shown in table when making requisition. (G. O., No. 10, A. G. O., 1902.)

List of spare parts for 100 Smith & Wesson revolvers, caliber .38, for one year.

[Issued to militia only.]

	Price each.		Price each.
1 bolt, complete.....	\$0.45	4 rebound-lever studs.....	\$0.05
4 bolt springs.....	.05	2 sear pins.....	.05
4 bolt-spring screws.....	.05	5 sear springs.....	.05
4 bolt-spring studs.....	.05	20 side-plate screws (long).....	.05
1 thumb piece.....	.20	10 side-plate screws (short).....	.05
5 bolt thumb-piece nuts.....	.05	1 stirrup.....	.10
1 center pin.....	.05	2 stirrup pins.....	.05
6 center-pin springs.....	.05	2 stocks (right), with escutcheons.....	.20
2 cylinder stops.....	.25	2 stocks (left), with escutcheons.....	.20
2 cylinder-stop studs.....	.05	1 stock pin.....	.05
1 extractor.....	.25	1 stock screw.....	.05
1 extractor rod.....	.10	5 strain screws.....	.05
5 extractor springs.....	.05	2 triggers, complete, with hand levers, hand springs, and pins.....	.50
2 extractor-rod knobs.....	.05	2 trigger levers.....	.10
5 frame lugs.....	.05	2 trigger-lever studs.....	.05
2 frame pins.....	.05	2 trigger springs.....	.15
2 hammers, complete, with hammer pins, stirrups, sears, sear springs, and pins.....	.80	2 trigger-spring pins.....	.05
2 hammer studs.....	.10	2 trigger studs.....	.05
2 hands.....	.20	2 yoke studs.....	.05
5 mainsprings.....	.20	5 yoke stops.....	.05
2 rebound levers.....	.10	5 yoke-stop springs.....	.05
1 sear.....	.10	10 yoke screws.....	.05

There are issued for use with this revolver tools for its repair: One set of tools, consisting of 1 hammer stud wrench, 1 trigger and rebound-lever stud wrench, 1 cylinder-stop stud wrench, and 3 drifts.

List of spare parts for 100 Colt revolvers, caliber .45, for one year.

[Issued to militia only.]

	Price each.		Price each.
1 back strap.....	\$0.30	4 hammer rolls.....	\$0.02
15 back-strap screws, assorted.....	.01	4 hammer-roll rivets.....	.04
2 center pins.....	.18	6 hammer screws.....	.65
15 center-pin catch screws.....	.02	4 hands, complete (with springs as- sembled).....	.72
3 ejector springs.....	.07	8 hand springs.....	.02
15 ejector-tube screws.....	.02	10 mainsprings.....	.30
4 firing pins.....	.06	10 mainspring screws.....	.02
4 firing-pin rivets.....	.01	20 screw-drivers.....	.10
6 gates.....	.55	10 rear and bolt springs.....	.02
6 gate catches.....	.01	10 rear-and-bolt-spring screws.....	.02
5 gate-catch screws.....	.01	3 stocks.....	.35
5 gate springs.....	.01	3 bolts.....	.10
1 guard.....	.50	10 bolt screws.....	.02
20 guard screws (long).....	.01	10 triggers.....	.10
10 guard screws (short).....	.02	10 trigger screws.....	.04
12 hammers, complete (with firing pins and rolls assembled).....	.64		

The following parts are not issued to the service for general repairs, as it requires the services of an expert armorer to apply them, and they are therefore issued to ordnance depots only, in the quantities given, per each 100 revolvers:

	Price each.
2 center-pin bushings.....	\$0.20
2 cylinders.....	1.60
3 ejector heads.....	.25
3 ejector rods.....	.17
3 ejector tubes.....	1.05
10 recoil plates.....	.05

The following parts are not issued:

	Price each.
Barrels.....	\$1.60
Frames.....	4.10
Front sights.....	.06
Hammer-cams.....	.01

When any of these parts become damaged the revolvers should be turned in.

NOTE.—Ordnance depots should be provided with a gauge to determine the space between cylinder and barrel, a range rod to test the alignment of the barrel and cylinder, and with a punch and set for replacing recoil plates. These tools will be issued to the militia upon requisition.

SHOTGUNS.

Shotguns are not issued to the service for use in guarding prisoners, but only for hunting purposes west of the Mississippi River (Par. X, G. O., No. 62, A. G. O., 1902).

For hunting purposes the Remington single barrel breech-loading shotgun of No. 12 bore was issued as the service gun of this kind, but its issue has now been discontinued. There have also been issued to and are now in the service, Springfield shotguns, No. 20, and Winchester repeating shotguns of No. 12 bore. The latter has been adopted as the service gun of this kind and will be issued in the future.

The allotment of such guns is two to each company or troop entitled to use them under the regulations, with an allowance of 500 loaded paper cartridges per company or troop per annum. The latter is issued in proportions of 250 No. 8, 185 No. 6, and 65 No. 4.

The charge for the 12-gauge cartridge is 40 grains of smokeless sporting powder, with $1\frac{1}{4}$ ounces of shot.

The cost at which the 12-gauge shotgun ammunition may be sold to the men under paragraph 422 of the Army Regulations is, paper cartridges, loaded, \$14.85 per thousand; for metallic cartridge cases, loaded, \$44.59 per thousand; for brass shells, empty, \$36 per thousand; for paper shells, empty, \$9 per thousand; shot, 5 cents per pound; smokeless powder, 85 cents, and black powder, 18 cents per pound; primers, \$1 per thousand; wads, — per thousand.

Field cases for shotguns are no longer issued to the service.

Components for the shotgun ammunition will not be issued in future for ammunition allowance, as prescribed by regulations, except for the Springfield shotgun No. 20. Loaded paper-cartridge shells will be issued instead. Components will, however, be issued for sale under section 422, Army Regulations, for reloading purposes.

For shipment across seas shotgun ammunition is issued loaded in metallic shells only.

Cartridges loaded with Nos. 4, 6, and 8 shot are the only sizes issued to troops for shotguns.

Winchester repeating shotgun.

Action slide.....	\$0.75	Firing pin stop pin.....	\$0.025
Action slide lock.....	.25	Guard bow.....	.75
Action slide lock spring.....	.025	Hammer.....	.25
Action slide lock pin screw.....	.025	Hammer pin.....	.025
Action slide lock release pin.....	.05	Magazine.....	.45
Action slide lock release pin plunger.....	.05	Magazine band.....	.35
Action slide spring.....	.15	Magazine band screw.....	.025
Action hook.....	.15	Magazine plug.....	.25
Action hook screw.....	.025	Magazine plug screw.....	.025
Barrel, plain.....	5.00	Magazine spring.....	.10
Breechblock.....	1.50	Magazine follower.....	.225
Butt plate.....	.40	Magazine stop screw.....	.025
Butt plate screws (2), each.....	.025	Main spring.....	.15
Butt stock.....	1.25	Main spring pin.....	.025
Carrier.....	1.00	Main spring strain screw.....	.025
Carrier pin.....	.025	Receiver, complete, with guard.....	5.00
Carrier pin stop screw.....	.025	Receiver bolt.....	.20
Cartridge guide.....	.15	Receiver bolt washer.....	.025
Cartridge guide stop screw.....	.025	Receiver shank.....	.125
Cartridge guide friction spring (coil).....	.125	Sear.....	.225
Cartridge stop, right or left hand, each.....	.175	Sear pin.....	.025
Cartridge stop screw, right or left hand, each.....	.025	Sear spring.....	.075
Ejector spring.....	.075	Sear spring screw.....	.025
Extractor, right hand.....	.15	Slide handle.....	.50
Extractor, right hand spring.....	.025	Slide handle escutcheons (3), each.....	.025
Extractor, right hand pin.....	.025	Slide handle screws (3), each.....	.025
Extractor, left hand.....	.175	Stirrup.....	.075
Extractor, left hand pin.....	.025	Stirrup pin.....	.01
Front sight.....	.125	Trigger.....	.225
Firing pin.....	.25	Trigger spring.....	.025
Firing pin lock.....	.25	Trigger pin.....	.025
Firing pin lock screw.....	.025		
Firing pin lock spring.....	.025	Cost of complete gun.....	14.00

The following spare parts are issued upon requisition for this gun, the quantities given being the estimated maximum number required for one year's supply for two guns:

	Price each.		Price each.
1 action slide spring.....	\$0.15	1 firing-pin.....	\$0.25
1 cartridge stop, right hand.....	.175	1 firing-pin lock spring.....	.025
1 cartridge stop, left hand.....	.175	1 hammer.....	.25
2 cartridge-stop screws, right hand.....	.025	2 main springs.....	.10
2 cartridge-stop screws, left hand.....	.025	1 sear spring.....	.075
2 ejector springs.....	.075	1 sear spring screw.....	.025
1 extractor, right hand.....	.15	2 slide-handle screws.....	.025
1 extractor, left hand.....	.175	1 trigger.....	.225
1 extractor spring, right hand.....	.025		

Springfield shotgun.

(20 gauge.)

Component parts.	Price each.	Component parts.	Price each.
Stock, wood part.....	\$0.67	Cam-latch spring.....	\$0.02
Side-screw washers (2).....	.04	Tang screw.....	.05
Escutcheon.....	.01	Forehand screw.....	.02
Butt plate.....	.27	Lock plate.....	.33
Butt-plate screws (2).....	.06	Main spring.....	.10
Guard plate.....	.27	Main spring swivel.....	.06
Guard bow.....	.20	Main spring swivel rivet.....	.08
Guard-bow nuts (2).....	.01	Hammer.....	.34
Trigger.....	.10	Tumbler.....	.01
Trigger screw.....	.01	Tumbler screw.....	.03
Guard screws (2).....	.02	Bridle.....	.14
Barrel (including receiver).....	3.17	Bridle screw.....	.04
Breech screw.....	.26	Sear.....	.11
Extractor.....	.20	Sear screw.....	.02
Hinge pin.....	.14	Sear spring.....	.14
Ejector spring.....	.02	Sear-spring screw.....	.01
Ejector-spring spindle.....	.04	Side screws (2).....	.06
Cam latch.....	.19	Total.....	3.45
Breech-lock cap.....	.06		
Thumb piece.....	.21	<i>Appendages.</i>	
Breechblock.....	.86	Wooden wiping rod.....	.64
Breechblock cap screw.....	.01	Screw-driver.....	.24
Firing pin.....	.11		
Firing-pin screw.....	.02		

The following spare parts are issued upon requisition for this gun, the quantities given being the estimated maximum number required for one year's supply for two guns:

	Price each.		Price each.
1 breechblock cap screw.....	\$0.01	1 firing-pin screw.....	\$0.02
1 cam-latch spring.....	.02	1 main spring.....	.10
1 ejector spring.....	.02	1 main spring swivel.....	.06
1 ejector-spring spindle.....	.04	1 sear spring.....	.14
1 extractor.....	.20	1 stock (wood part).....	.67
1 firing pin.....	.13	1 tumbler screw.....	.03

Remington single-barrel breech-loading shotgun.

[Model No. 3, 12 gauge.]

Component parts.	Price each.	Component parts.	Price each.
Barrel.....	\$3.40	Stocks, tip (iron).....	\$0.40
Butt plate.....	.40	Tang screw.....	.04
Butt-plate screw (2), each.....	.04	Top lever.....	.40
Cocking lever.....	.40	Top-lever screws.....	.04
Cocking-lever screw.....	.06	Top-lever swivel.....	.11
Extractor.....	.18	Top-lever washer (2), each.....	.04
Extractor pin.....	.04	Tip-stock bolt.....	.18
Extractor fly.....	.11	Tip-stock bolt cap.....	.11
Extractor-fly pin.....	.04	Tip-stock bolt-cap screw (2), each.....	.04
Firing pin.....	.18	Tip-stock bolt screw.....	.04
Firing-pin spring.....	.04	Tip-stock bolt spring.....	.06
Frame.....	2.65	Tip-stock iron screw (large).....	.04
Front sight.....	.04	Tip-stock iron screw (small).....	.04
Hammer.....	.40	Tip-stock plunger.....	.18
Hammer roll.....	.04	Tip-stock plunger washer.....	.04
Hammer-roll pin.....	.04	Trigger.....	.20
Joint pin.....	.04	Trigger pin.....	.04
Locking-bolt rocker.....	.18	Trigger and top-lever spring.....	.18
Main bolt.....	.15	Trigger and top-lever spring pin.....	.04
Main spring.....	.80	Trigger plate and guard.....	.55
Main spring screws.....	.04	Trigger plate and guard screws, front.....	.04
Side plate.....	.11	Trigger plate and guard screws, side.....	.04
Side-plate screws (2), each.....	.04	Trigger plate and guard screws, rear.....	.04
Stocks, butt (wood part).....	1.50		
Stocks, tip (wood part).....	.76	Cost of complete gun.....	6.25

Remington single-barrel breech-loading shotgun.

[Model No. 9, 12 gauge.]

Component parts.	Price each.	Component parts.	Price each.
Barrel.....	\$3.40	Locking-bolt rocker.....	\$0.18
Bolt stop pin.....	.04	Mainspring.....	.30
Butt plate.....	.40	Mainspring screw.....	.04
Butt-plate screw (large).....	.04	Side plate.....	.11
Butt-plate screw (small).....	.04	Side-plate screw (2).....	.04
Cocking-lever.....	.40	Stock, butt.....	1.50
Cocking-lever screw.....	.08	Stock, tip.....	.65
Extractor.....	.18	Stock, tip, complete.....	.95
Ejector adjusting screw.....	.04	Tang screw.....	.18
Ejector coil spring.....	.08	Tip-stock iron.....	.18
Ejector release stud.....	.08	Tip-stock iron screw (2).....	.04
Ejector release stud spring.....	.08	Tip-stock screw.....	.04
Ejector release stud-spring screw.....	.04	Tip-stock screw washer.....	.04
Ejector stop pin.....	.04	Top lever.....	.40
Ejector trip lever.....	.15	Top-lever screw.....	.04
Ejector trip-lever pin.....	.04	Top-lever spring.....	.08
Firing pin.....	.15	Top-lever swivel.....	.11
Firing-pin spring.....	.04	Top-lever washer (2).....	.04
Frame.....	2.65	Trigger.....	.20
Front sight.....	.04	Trigger pin.....	.04
Hammer.....	.40	Trigger spring.....	.11
Hammer roll.....	.04	Trigger-spring screw.....	.04
Hammer-roll pin.....	.04	Trigger-guard.....	.18
Joint pin.....	.15	Trigger-guard screw.....	.04
Joint-pin cam pin.....	.04	Trigger plate.....	.40
Joint-pin lever.....	.15	Trigger-plate screw (side).....	.04
Joint-pin lever pin.....	.04	Trigger-plate screw (rear, wood).....	.04
Joint-pin lever spring.....	.04		
Locking bolt.....	.80	Cost of complete gun.....	6.25

The following spare parts are issued upon requisition for these guns, the quantities given being the estimated maximum number required for one year's supply for two guns:

For Model No. 3, 12 gauge.

1 butt plate.	1 top-lever screw.
2 butt-plate screws.	1 top-lever swivel.
1 cocking lever.	2 top-lever washers.
1 cocking-lever screw.	1 tip-stock bolt.
1 extractor.	1 tip-stock bolt cap.
1 extractor pin.	2 tip-stock bolt-cap screws.
2 extractor flies.	1 tip-stock bolt screw.
2 extractor-fly pins.	1 tip-stock bolt spring.
1 firing pin.	1 tip-stock iron screw (large).
1 firing-pin spring.	1 tip-stock iron screw (small).
1 hammer.	1 tip-stock plunger.
2 locking bolts.	1 tip-stock plunger washer.
1 locking-bolt rocker.	1 trigger.
2 mainsprings.	1 trigger pin.
1 mainspring screw.	2 trigger and top-lever springs.
2 side-plate screws.	1 trigger and top-lever spring pin.
1 stock tip (wood part).	1 trigger and plate-guard screw (front).
1 tang screw.	1 trigger and plate-guard screw (side).
1 top lever.	1 trigger and plate-guard screw (rear).

For Model No. 9, 12 gauge.

1 butt plate.	1 locking bolt.
1 butt-plate screw (large).	1 locking-bolt rocker.
1 butt-plate screw (small).	2 mainsprings.
1 cocking lever.	1 mainspring screw.
2 cocking-lever screws.	2 side plate screws.
1 extractor.	1 stock tip (wood part).
1 ejector adjusting screw.	1 tang screw.
1 ejector coil spring.	2 tip-stock iron screws each.
1 ejector release stud.	1 tip-stock screw.
1 ejector release stud spring.	1 top lever.
1 ejector release stud-spring screw.	1 top-lever screw.
1 ejector stop pin.	2 top-lever springs.
1 ejector trip lever.	1 top-lever swivel.
1 ejector trip-lever pin.	2 top-lever washers each.
1 firing pin.	1 trigger.
1 firing-pin spring.	1 trigger pin.
1 hammer.	1 trigger spring.
1 joint pin.	1 trigger-spring screw.
1 joint-pin lever.	1 trigger-plate screw (side).
1 joint-pin lever pin.	1 trigger-plate screw (rear, wood).
1 joint-pin lever spring.	

Inasmuch as but a very few of the parts of the Model No. 3 and Model No. 9 Remington shotguns are interchangeable, it is very essential that requisitions for such parts give the model of gun for which they are required, to avoid the necessity of returning the requisition for this information.

RELOADING TOOLS FOR SHOTGUNS.

Reloading tools are issued to the service for use with shotguns, the allowance being one set of tools, to fit the particular gun in use, to each company or troop.

The reloading set for the Springfield rifle is composed of the following:

	Price each.
Priming tool, spindle, sleeve, and five pins.....	\$2.85
Crimping die.....	.15
Anvil for crimping die.....	.20
Spreader.....	.20
Funnel.....	.02
Brush wiper.....	.24
Drift.....	.06
Adjustible powder and shot charger.....	.38
Wooden mallet.....	.09
Tool box.....	1.25
Total.....	5.84

The reloading set for the Winchester repeating shotgun is composed of the following:

Primer extractor and loader } 3 pieces.
 Safety socket
 Loading funnel.
 Priming tool.
 Powder charger.
 Crimping tool.
 Shell extractor, hand.
 Wiping rod (3 sections), with 2 wipers.
 Wire cleaner and worm.

Price, \$1.31 per set.

The reloading set for the Remington single-barrel repeating shotgun is composed of the following:

Primer extractor and priming tool.
 Primer extractor and loader } 3 pieces.
 Safety socket
 Loading funnel
 Powder charger.
 Price, \$1 per set.

TARGETS.

These targets are fully described in Description of the Artillery and Small-Arms Targets, published by the Ordnance Department.

A target complete is the whole apparatus of wood, iron, etc., on which the paper target is exposed, including the necessary frames. In making requisitions for targets the name of the "system and size" should be designated, using the nomenclature as given in this manual.

The following targets are issued to cavalry and infantry posts and seacoast artillery posts that have ranges available for small-arms practice firing:

Sliding targets 6 by 6 and 6 by 12 feet.
 Revolving targets (Laidley), vertical axis, 6 by 6 and 6 by 12 feet.
 Revolving targets (Laidley), horizontal axis, 6 by 6 and 6 by 12 feet.
 Revolving targets (Texas), 6 by 6 feet.
 Rolling targets 6 by 12 feet.

With these targets are issued the following paper targets:

- Paper targets A.
- Paper targets B.
- Paper targets C.
- Paper targets F.
- Paper targets K.

SKIRMISH TARGETS (STEEL FRAMES).

Skirmish targets are issued in four sizes.

	Price each.
"E" (lying) model 1903.....	\$0.64
"D" (kneeling) model 1903.....	1.34
"H" (standing) model 1903.....	1.72
"M" (mounted) model 1903.....	5.96

The latter is for cavalry and light artillery only. The cloth and paper silhouettes for these frames are designated by the same letters.

SLIDING TARGETS.

Each target complete consists of:

	Price each.	
	6 by 6 feet.	6 by 12 feet.
1 timber frame support.....		
2 carriages.....		
6 target frames.....		
Total.....	\$35.53	\$46.79

List of parts for timber frame support.

Wood.	Price each.		Metal.	Price each.	
	6 by 6 feet.	6 by 12 feet.		6 by 6 feet.	6 by 12 feet.
1 main sill.....			2 stay rods.....	\$1.13	\$1.13
1 top beam.....			4 eyebolts.....		
2 cross sills.....			4 slide rods.....		
2 posts.....		\$0.60	2 top plates (for slide rods).....	.40	.40
2 braces.....			2 bottom plates (for slide rods).....	.86	.86
2 pieces wash cord 12 feet long.....			8 bolts, 6 1/2 inches long.....	.20	.20
			8 bolts, 6 1/2 inches long.....	.20	.20
			2 pulleys and fittings.....		2.50
			4 wash-cord clamps.....		.58
			2 fastening hooks.....		
			2 rollers with fastenings.....		

List of parts of two carriages.

	Price each.
8 slide irons and bolts.....	
2 wooden carriage frames.....	

List of parts of target frames (sliding target).

6 by 6 feet frame.	Price each.	6 by 12 feet frame.	Price each.
2 vertical rails.....	\$0.20 .62	2 vertical rails.....	
2 horizontal rails.....		2 horizontal rails.....	
4 wedges.....		4 corner braces.....	
Paper targets A and B are used on these frames.....		4 wedges.....	
		8 pins.....	
		Paper targets C are used on these frames.....	
Total.....	\$1.06	Total.....	\$1.68

The parts of the timber frame support and target frame here given are all the parts for which requisition should be made under the head of spare parts. The nomenclature of parts for both sizes of targets is the same, but as the dimensions differ it is imperative that requisition for parts specify for which size targets they are required.

Parts for repairing wooden carriage frames are not furnished. These frames can usually be repaired with lumber on hand or requisition can be made for same. The good parts of broken or condemned carriages should be preserved and used in the repair of others.

Revolving target (Laidley).

[Frame support, vertical axis.]

Component parts.	Price each.		Component parts.	Price each.	
	6 by 6 feet.	6 by 12 feet.		6 by 6 feet.	6 by 12 feet.
1 axle.....	\$0.47	\$2.14	2 iron springs.....		
2 levers.....	.27	.27	6 target frames (8 pairs).....		
2 nave boxes.....	.98	.98	4 half-inch round wooden pins.....	\$0.01	\$0.01
1 center or lever block.....	.88	.88	1 top support with 2 turned pins.....		
4 large wedges.....	.02	.02	1 journal box.....		
2 small wedges.....	.02	.02	Total.....	\$11.12	\$17.40
2 spring blocks.....	.70	.70			
1 gudgeon block.....					
1 treadle.....					

Parts of target frame (Laidley vertical axis.)

6 by 6 frame.		Price each.	6 by 12 frame.		Price each.
2 side rails.....		\$0.33	2 side rails.....		\$0.45
1 outer rail.....		.80	1 outer rail.....		.85
1 inner rail.....		.88	1 inner rail.....		.30
4 wedges.....		.02	1 brace, diagonal.....		
			4 wedges.....		.02
			2 pins.....		.01
Total.....		\$1.06	Total.....		\$1.60

Revolving target (Laidley).

[Frame support, horizontal axis.]

Component parts.	Price each.		Component parts.	Price each.	
	6 by 6 feet.	6 by 12 feet.		6 by 6 feet.	6 by 12 feet.
1 axle.....			2 iron springs.....		
2 levers.....			1 pulley.....		
2 nave boxes.....			4 large wedges.....		
1 center or lever block.....			2 small wedges.....		
2 journal boxes.....			4 1/4-inch wooden pins.....		
2 journal posts with 4 turned pins.....			6 target frames.....		
1 treadle and stake.....			Total.....	\$15.37	\$18.25
2 spring blocks.....					

Parts of target frames (Laidley horizontal axis).

6 by 6.		Price each.	6 by 12.		Price each.
2 side rails.....			2 side rails.....		
1 outer rail.....			1 outer rail.....		
1 inner rail.....			1 inner rail.....		
4 wedges.....			2 braces, corner.....		
			4 wedges.....		
			4 pins.....		
Total.....		\$1.06	Total.....		\$1.68

Revolving target (improved horizontal axis).

Component parts.	Price each.		Component parts.	Price each.	
	6 by 6 feet.	6 by 12 feet.		6 by 6 feet.	6 by 12 feet.
1 axle.....	\$0.47	\$2.14	4 vertical frames.....	\$1.38	\$2.16
1 lever.....	.27	.27	4 horizontal frames.....	1.38	2.16
2 journal posts \$1.44 each, with 2 turned pins, \$0.03 each.....	1.50	1.50	8 wedges.....	.02	.02
1 spring.....	.60		4 blocks for stiffening frames.		
2 iron yokes for frames.....			2 pieces rope.....		
1 iron yoke for lever.....			Total.....		

The principal differences in this target are:

It has two target frames 6 by 6 feet (each forming a target), joined to a common axle.

The axle ends rest in journal posts held in place by round hard-wood pins.

A lever for turning the target, with short ropes through its ends to aid in doing so, is attached to one end of axle.

An iron spring for holding the target in a vertical position is attached to the right-hand upright 18 inches from the bottom of the pit.

PARTS OF TARGET FRAMES.

The same as for the 6 by 6 feet vertical axis frame.

The nomenclature of a large number of the parts for all four of the revolving targets (Laidley) are the same, but as the dimensions differ it is imperative that requisitions for parts state for what size and kind of target they are required.

Revolving targets (Texas).

Component parts of revolving center.	Price each.	Component parts of revolving center.	Price each.
1 center piece.....		4 sill stakes.....	
2 lock blocks.....		2 wedges for uprights.....	
1 axle (iron pipe).....		1 latch bar.....	
1 top sill.....		1 latch-bar cleat.....	
1 bottom sill.....		Total.....	\$18.24
1 rear upright.....			
1 front upright.....			

This target has the center piece arranged so that the target frame will form either the A or B target. Six frames for each target are issued with each complete target.

Parts of target frames (Texas).

6 by 4 feet and 6 by 6 feet.	Price each.	
	6 by 4 feet.	6 by 6 feet.
2 top rails.....		
2 inside rails.....		
4 outside rails.....		
4 frame wedges.....		
Total.....		\$0.65

The nomenclature of the parts of the two sizes of frames is the same, but differ in the length of top and inside rails. In making requisition for these parts size of frame should be given.

The target is provided with a locking apparatus to stop and hold same in position.

Parts of locking apparatus.	Price each.	Accessories for axle.	Price each.
1 spring bolt		1 axle bolt, iron	
1 spring		2 axle-end washers	
1 spring loop		1 axle washer	
1 lock-bolt plate		1 axle-bolt cap	
1 lock-bolt rope			

Dimensions of parts of revolving target (Texas).

Parts.	Number.	Length.	Width.	Thickness.	Washers.				Screws.		
					Number.	Diameter.	Thickness.	Hole.	Number.	Length.	Size.
Revolving center:											
Centerpieces	1	6	9½	7	3				8	1	8
Lock blocks	2	13	3	3					4	3	12
Lock pins (wood)	8	3		1½							
Axle (iron pipe)	1	8½		1½							
Axle washer (wood)	1	4	4	1½							
Target frames, 4 by 6 feet:											
Outside rails	4	6	10	2	1						
Inside rails	2	4	2	1							
Top rails	2	4	4	2	1						
Wedges	4	5½	1½	1							
Pins (wood)	4	2		1							
Target frames, 6 by 6 feet:											
Outside rails	4	6	10	2	1						
Inside rails	2	6	2	1							
Top rails	2	6	4	2	1						
Wedges	4	5½	1½	1							
Pins (wood)	4	2		1							
Sills:											
Bottom	1	3	4	8	4						
Top	1	4	9	8	4						
Stakes	4	2	6	3	3						
Belts	2	8½		1	2	1½	1½	1			
Bolts	2	4½		1	2	1½	1½	1			
Front upright:											
Front upright	1	9	6	4							
Lock bolt	1	14	1½	1							
Lock springs	1	16	1½	1							
Lock-bolt plate	1	8½	3½	1					4	1	8
Wedge	1	9	2½	1½							
Axle-end washer	1	5½	1	1	1	1½	1	1	2	1	8
Spring loop	1	8	8	3					4	3	12
Latch-bar cleat ^b	1	1	1½	1							
Axle-bolt cap (wood)	1	10		1	1	1	1	1			
Axle bolt	1			1							
Rear upright:											
Rear upright	1	9	6	4							
Wedges	1	9	2½	1½							
Axle-end washer	1	5½	1	1	1	1½	1	1			
Latch bar	1	22½	8	1							
Latch-bar bolt	1	7½		1							

^a And 2 iron rivets, one-half inch, No. 6.

^b And 2 casing nails, 10d.

ROLLING (CUSHING) TARGET.

One complete target of this kind consists of:

	Price each.
1 car	
2 pieces of track	
6 target frames, 6 by 6 feet	
Total	\$40.60

This furnishes a double target for paper targets A and a single target for paper targets B and C.

Paper targets A are mounted one at each end of frame and exposed alternately at each end of butt.

Only one paper target B or C can be mounted on frame.

To convert the frame into a double target for these targets add one car and one piece of track.

Component parts of target.

One car.	Price each.	One piece of track.	Price each.
1 wood frame		1 wood frame, with iron tie rods	
4 truck wheels (iron)		2 iron rails	
2 axles		4 fish plates	
4 half boxes		8 fish-plate bolts	
4 hook bolts		20 spikes	
1 pole			
1 piece of rope, 12 feet long			

Parts of target frame (rolling target).

	Price each.		Price each.
2 vertical rails		4 wedges	
2 horizontal rails		8 pins	
4 corner braces	\$0.29	6 pins, headed	\$0.02
2 rear braces .....	.10	Total .....	.08

Parts for repairing the wooden carriage frames of the rolling targets are not furnished. See carriage frames for sliding targets.

If desirable for any reason to change a 6 by 6 feet target into a 6 by 12 feet target, or vice versa, this can readily be done by utilizing the interchangeable parts of the target on hand and making requisition for the additional parts required, as shown by the lists published herein, to complete the target desired.

INTERCHANGEABLE PARTS OF TARGET FRAMES.

The vertical rails in sliding target frames are the same both for the 6 by 6 and 6 by 12 feet frames. The same rails can be used on the rolling target by cutting off 24 inches at the bottom.

All parts for the 6 by 12 feet target frames for the sliding and rolling targets are identical, except the length of the vertical rails on rolling target.

The parts of the frames for revolving (Laidley) targets are not interchangeable with the sliding and rolling targets.

Wedges and pins are not issued with spare parts of target frames unless specifically asked for.

Paper targets A, B, and C are issued in units of 50, 50, and 25, respectively, and paper-target centers A, B, and C in units of 50 each, and will not be issued in broken quantities. Officers should be governed accordingly in making requisitions.

Paper targets C can be used on 6 by 12 feet target frames only, for all targets.

Paper targets A and B are used on the 6 by 6 feet target frames of the revolving and sliding targets, but can be mounted on the 6 by 12 feet frame. They are also used for the 6 by 12 feet frames of the rolling target.

Six target frames are issued with each complete target. Four are extra to substitute for those destroyed by firing.

Extra target frames are issued as required in lots of six, the unit of issue, or multiples thereof. Officers should conform requisitions to these units.

Extra inside rails are issued as required.

Interior target frames are issued from time to time as required in the following sizes:

	Price each.
4 by 6 inches	\$0.40
6 by 6 inches .....	.44
6 by 12 inches .....	.68

Parts of target frames are issued to the service upon requisition as required from time to time. It is imperative in doing so that the nomenclature, sizes, axis, kind, etc., of target for which required, be given; otherwise the material can not be ordered.

Cotton cloth for target frames is issued by the yard, and should be so required for.

After a post or firing ground has been supplied with its outfit of targets new targets will not be supplied until the old targets have been condemned by an inspector.

Targets should not be condemned if repairable.

Target frames, though perishable on account of destruction by firing, are not expendable, and must be submitted to the action of an inspector before they can be dropped from the property returns.

After targets or target frames have been passed upon by an inspector and condemned they should be broken up and the good parts retained at post for use in repairs, or turned in to the nearest ordnance depot.

Cotton cloth and paper targets are expendable.

For more complete description of targets, etc., see pamphlet Description of the Artillery and Small Arm Targets, which will be issued by the Ordnance Department upon application.

The following is the allowance for permanent equipment of target ranges at posts:

(None expendable.)

Number of companies in Garrison.	Targets.					Marking disks and staves.			Flags.		
	Known distance.		Skirmish (steel frames).								
	6 by 6 feet.	6 by 12 feet.	Lying, E.	Kneeling, D.	Standing, H.						
1	2	1				2	2	1	3	3	3
2	2	1				2	2	1	3	3	3
3	2	1				2	2	1	3	3	3
4	2	1				2	2	1	3	3	3
5	2	1				2	2	1	3	3	3
6	2	1				2	2	1	3	3	3
7	2	1				2	2	1	3	3	3
8	2	1				2	2	1	3	3	3
9	2	1				2	2	1	3	3	3
10	2	1				2	2	1	3	3	3
11	2	1				2	2	1	3	3	3
12	2	1				2	2	1	3	3	3
13	2	1				2	2	1	3	3	3
14	2	1				2	2	1	3	3	3
15	2	1				2	2	1	3	3	3
16	2	1				2	2	1	3	3	3
17	2	1				2	2	1	3	3	3
18	2	1				2	2	1	3	3	3

^a For cavalry only.

Requisition calling for any variations of the allowances for equipments given in the table should be accompanied by a full explanation of the necessity for same.

When the post range for long-distance firing is entirely distinct from the short and mid ranges, four additional streamers will be supplied. This fact should be stated in the requisition.

For post ranges on which the annual competitions are also held the equipment will be determined by the particular requirements in each case, special requisition being made for same, setting forth clearly in detail all the requirements, exercising care to insert the correct nomenclature of the articles as given in this manual.

Staves for signal flags are not issued by the Ordnance Department.

In making requisition for parts of targets it is imperative that the system in use, the pattern, and size be specified, otherwise the parts can not be ordered.

Paints are issued for renovation of targets and for painting shot marks—white lead, black and vermilion paints.

Sperm oil is supplied for use on the ranges as a lubricating oil.

Halyards go with streamers when streamers are called for, but are issued separately when required.

The annual allowance of supplies for target ranges, all of which are expendable is as follows:

(All expendable.)

Number of companies in garrison.	Cotton cloth 72 inches wide, yards.	Tacks, iron, 8-ounce.	Paints.			Sperm oil, gallons.	Cloth alhoupettes. ^a				
			White lead, pounds.	Black, pounds.	Vermilion, pounds.		H.		D.	F.	M. ^b
							Infantry troops.	For cavalry troops.			
1	128					2	30	40	40	40	20
2	128					4	40	50	60	60	30
3	192					6	40	50	60	60	30
4	256					8	50	60	80	80	40
5	320					10	50	60	80	80	40
6	320					12	60	75	100	100	50
7	448					14	60	75	100	100	50
8	448					16	60	75	100	100	50
9	512					18	70	90	125	125	60
10	512					20	70	90	125	125	60
11	576					22	70	90	125	125	60
12	576					24	70	90	125	125	60
13	648					26	80	110	150	150	70
14	648					28	80	110	150	150	70
15	720					30	80	110	150	150	70
16	720					32	80	110	150	150	70
17	820					34	80	110	150	150	70
18	820					36	80	110	150	150	70

^aStrings are supplied attached to cloth silhouettes.

^bFor cavalry only.

(All expendable.)

Number of companies in garrison.	Paper silhouettes.					Paper targets.						Centers for paper targets.		
	H.					K.								
	Infantry troops.	For cavalry troops.	D.	E.	M. ^a	A. ^b	Infantry troops.	Cavalry.	B.	C.	F.	A. ^b	B.	C.
1	100	150	200	200	50	50	25	50	50	25	50	25	25	25
2	150	200	350	350	100	100	25	100	100	50	100	50	50	25
3	150	200	350	350	100	100	25	100	100	50	100	50	50	25
4	250	300	400	400	150	150	50	150	150	75	150	75	75	50
5	250	300	400	400	150	150	50	150	150	75	150	75	75	50
6	400	500	600	600	200	200	50	200	200	100	200	100	100	50
7	400	500	600	600	200	200	50	200	200	100	200	100	100	50
8	400	500	600	600	200	200	50	200	200	100	200	100	100	50
9	600	750	800	800	300	250	75	250	250	125	250	125	125	75
10	600	750	800	800	300	250	75	250	250	125	250	125	125	75
11	600	750	800	800	300	250	75	250	250	125	250	125	125	75
12	600	750	800	800	300	250	75	250	250	125	250	125	125	75
13	800	1,000	1,000	1,000	400	300	100	300	300	150	300	150	150	75
14	800	1,000	1,000	1,000	400	300	100	300	300	150	300	150	150	75
15	800	1,000	1,000	1,000	400	300	100	300	300	150	300	150	150	75
16	800	1,000	1,000	1,000	400	300	100	300	300	150	300	150	150	75
17	800	1,000	1,000	1,000	400	300	100	300	300	150	300	150	150	75
18	800	1,000	1,000	1,000	400	300	100	300	300	150	300	150	150	75

^a For cavalry only.^b Allowance to be doubled for cavalry.

NOTE.—Patterns are issued, buff and black, each in quantities of 22 boxes per troop for cavalry and 15 boxes per company for infantry or foot troops.

Paste brushes, 4-inch flat, 2 per organization all arms of the service.

Except where specified for cavalry, the allowances of target material given in the table applies to all troops except light and siege artillery.

The annual allowance of miniature paper targets, "X," "Y," and "Z," will be 200 of each per company, for such companies whose practice has been ordered in special course "B," as provided by G. O. 20, A. G. O., 1903. (The latter fact should be stated in the requisition.) Also, 5 of each per recruit.

TARGETS FOR GALLERY PRACTICE.

Iron targets for gallery practice are issued in three sizes, for use at 50, 75, and 100 feet. Requisitions should state what size is required. Price each, \$2.63.

Marking rods, disks, and brushes are issued, as required, upon requisition for use with the iron gallery targets. A set consists of four wooden rods, 3 feet long, having at one end a disk painted a certain color on one side, and on the reverse side a small paint brush. The disks are 2 inches in diameter and are painted on the side opposite to the brush, respectively, "black," "white," "red," and "white with black cross."

Marking rods, disks, and brushes are not expendable, and must be submitted to an inspector before being dropped from return.

To avoid difficulty and expense of numerous small issues from arsenals, acting ordnance officers will make requisition annually for the annual supply, as fixed by the supply tables of the following stores coming under the head of this chapter:

1. All ball and blank cartridges for rifle, carbine, and revolver.
2. All material for gallery practice. When round balls are asked for, the requisition should show that no material for recasting is available.
3. Shotgun ammunition, loaded paper cartridges, and component parts for sale for reloading as herein provided for, if any be required.
4. Target supplies.
5. Spare parts for small arms.

The Ordnance Department will provide the requisite targets, streamers, and flags. The Quartermaster's Department will set up the targets, prepare the range, and con-

struct shelters for the markers. Flour for making paste for use in target practice will be issued by the commissary. (A. R., 421.)

The targets and target material at posts will be accounted for by the acting ordnance officer, who will also make requisitions for such material. (G. O. 81, A. G. O., 1888.)

Requisitions for targets should be explicit as to the kinds of targets and target material wanted, in accordance with the list in schedules provided in this manual.

Prices of target material and supplies.

Marking disks and staves:		Price each.
Short range		\$0.50
Middle range .....		.90
Long range		1.35
Danger flags .....		.68
Ricochet flags .....		.77
Streamers		5.13
Halyards for streamers, 30 feet long with screw eye .....		.05
Cloth silhouettes with strings:		
D .....		.11
E .....		.07
H .....		.16
M .....		.39
Paper silhouettes:		
D .....		.01
E .....		.01
H .....		.02
M .....		.02
Paper targets:		
A .....		.035
B .....		.04
C .....		.07
F .....		.04
K .....		.035
X	per hundred ..	.51
Y	do ..	.55
Z	do ..	.76
Centers for paper targets:		
A	per hundred ..	.80
B	do ..	2.50
C	do ..	3.80
Pasters:		
Black	per thousand ..	.10
White	do ..	.10
White	per box ..	.05
Black	do ..	.05
Staves for marking disks:		
Short .....		.17
Middle		
Long .....		.20
Marking disks		
Marking rod, disk, and brush for gallery practice set of 4 .....		.56
Paints:		
White lead	per pound ..	.08
Black	do ..	.12
Vermilion	do ..	.08
Cotton cloth, 72 inches wide		per yard .. .27

SWORDS AND SABERS.

The following swords and sabers, manufactured by the Ordnance Department, U. S. Army, are issued to and sold for service use in the U. S. Army:

Kind.	For use of—
Officer's saber	All officers, except chaplains.
Cadet sword	U. S. Military Academy cadets.
Musician's sword	Noncommissioned officers of foot troops.
Cavalry and field artillery saber	Enlisted men and noncommissioned officers of cavalry troops and noncommissioned officers of field artillery.

The swords enumerated in this table are those directed to be worn by General Orders, No. 81, A. G. O., 1902.

Swords are no longer carried by or issued to band or company musicians of foot troops. (G. O. No. 60, A. G. O., 1895.)

Sabers and spurs are parts of an officer's personal equipment and should be purchased by the officers whose duties require them to use them. (Cir. 2, par. 2, A. G. O., 1894.)

Scabbards for officers' sabers can be furnished separately from National Armory, Springfield, at the prices quoted in the price lists furnished by the Ordnance Department.

Whistles will be placed on infantry officers' swords when requested, the cost to be paid by owner of the sword. This cost will be about \$3.75 each for lots of 50 or more, but the expense will necessarily be greater where work is conducted on but a few swords at a time.

All the sergeants, corporals, trumpeters, artificers, and the guidon of a battery of field artillery will be armed with sabers, a total of 28 sabers to each battery. (G. O., No. 134, A. G. O., 1901.)

For manner of packing for shipment and weight of arm chests see packing and transportation, page —

The officer's saber is uniform for all officers (except chaplain). The guard and scabbard of saber are of German silver, the bands closer together, above the center of gravity, and are brazed to the scabbard. It is made in three lengths of blade, 30, 32, and 34 inches.

The scabbard of a general officer's saber has a number of stars placed between the bands corresponding to the officer's rank.

Sword blades can not be sold alone, but must be sold with scabbard. Scabbards can be sold separately.

Component parts of officer's saber.

Sword.	Price each.	Scabbard.	Price each.
Blade (steel nickel-plated)	\$3.63	Scabbard body (sheet German silver) ..	\$2.82
Pommel (German silver) .....	.75	Upper band, with rings (German silver with rings; bands brazed on body) ..	
Guard (German silver)	1.45	Lower band, with rings (German silver with rings; bands brazed on body) ..	
Gripe, black horn (4 finger grooves)	1.00	Tip (German silver; front and rear branches; front branch slotted at bottom for steel guard; brazed on body)	
Ferrules (German silver; 4 grooves) ....	.25	Mouthpiece (German silver)	
Assembling .....	.17	Mouthpiece screws (2), 5 cents each .....	.10
		Interior linings (2) (seasoned spruce), 9 cents each .....	.18
		Assembling .....	.15
		Total	11.00

Component parts of cadet sword.

Sword.	Price each.	Scabbard.	Price each.
Blade		Scabbard	
Hilt		Ferrule and hook tip	
Shoulders		Tip	
Mortise		Mouthpiece	
Gripe		Interior lining	
Shoulder			
Pommel			
Scroll			

Component parts of musician's and noncommissioned officer's sword.

Sword.	Price each.	Scabbard.	Price each.
Blade	\$2.20	Scabbard body, steel	
Pommel .....	.50	Ferrule and hook	\$0.36
Ferrules (2) .....	.10	Tip .....	.25
Guard .....	.54	Total	4.50
Gripe .....	.24		

Component parts of cavalry and field artillery saber.

Sword.	Price each.		Scabbard.	Price each.	
	Field Artillery.	Cavalry.		Field Artillery.	Cavalry.
Blade		\$3.00	Rivets (2)		
Pommel .....		.75	Bands and rings (2)		\$0.60
Gripe .....		.22	Tip		
Guard		1.20	Total	\$5.00	\$6.00
Scabbard body		1.25			
Mouthpiece, with springs .....		.20			

^a Cavalry saber issued in future to cavalry troops and noncommissioned officers of field artillery. (G. O. 81, A. G. O., 1902.)

Spare parts required for repairs of 100 swords or sabers one year.

Parts.	Cavalry and light artillery saber.	Musician's (N. C. O.) sword.	Price each.	
			Cavalry.	N. C. O.
Gripes	5		\$0.22	
Gripe and ferrules		5		\$0.44
Head	5	5		
Guards	5	5	.54	1.20
Mouthpieces and springs	5		.20	
Ferrules and stud hooks		10		.36
Upper bands and rings	5		.60	
Lower bands and rings	5		.60	

Principal dimensions of swords and sabers.

Dimensions.	Officer's saber.	Cavalry and field artillery saber.	Musician's (N. C. O.) sword.	Cadet sword.
	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>
Whole length in its scabbard		42.35	32.75	35.12
Length of blade		34.80	26	28.70
Length of scabbard		36.06	29	29.45
Width of blade in the middle		1	.72	.51
Verred sine of the curvature of the blade in the middle		1.42		
Verred sine of the curvature of the blade in proof		7.20		7.6

Weights and positions of center of gravity of swords in the United States service, the center of gravity being measured from the face of pommel.

Kind.	Weight.		Center of gravity.	
	Sword.	Sword and scabbard.	Sword.	Sword and scabbard.
	Ounces.	Ounces.	Inches.	Inches.
Officer's saber.....	19.26	33.67	7½	13½
Cadet officer's saber.....	24.07	35.33	9½	12½
Musician's (N. C. O.) sword.....	34.68	64.16	12½	15½
Cavalry and field artillery saber.....				

ISSUES OF MAGAZINE RIFLES AND CARBINES, CALIBER .30, EQUIPMENTS, ETC., TO MILITIA.

Arms and equipments are issued to the militia of the States under the provisions of section 1861 of the Revised Statutes of the United States as amended February 12, 1887, which provides as follows:

"SECTION 1. That the sum of * * * dollars is hereby annually appropriated, to be paid out of any money in the Treasury not otherwise appropriated, for the purpose of providing arms, ordnance stores, quartermaster's stores, and camp equipage for issue to the militia.

"SEC. 2. That said appropriation shall be apportioned among the several States and Territories, under the direction of the Secretary of War, according to the number of Senators and Representatives to which each State respectively is entitled in the Congress of the United States, and to the Territories and District of Columbia such proportion and under such regulations as the President may prescribe: *Provided, however,* That no State shall be entitled to the benefits of the appropriation apportioned to it unless the number of its regularly enlisted, organized, and uniformed active militia shall be at least one hundred men for each Senator and Representative to which such State is entitled in the Congress of the United States. And the amount of said appropriation which is thus determined not to be available shall be covered back into the Treasury.

"SEC. 3. That the purchase or manufacture of arms, ordnance stores, quartermaster's stores, and camp equipage for the militia under the provisions of this act shall be made under the direction of the Secretary of War, as such arms, ordnance and quartermaster's stores, and camp equipage are now manufactured or otherwise provided for the use of the Regular Army, and they shall be receipted for and shall remain the property of the United States, and be annually accounted for by the governors of the States and Territories, for which purpose the Secretary of War shall prescribe and supply the necessary blanks and make such regulations as he may deem necessary to protect the interest of the United States.

"SEC. 4. That all arms, equipments, ordnance stores, or tents which may become unserviceable or unsuitable shall be examined by a board of officers of the militia, and its report shall be forwarded by the governor of the State or Territory direct to the Secretary of War, who shall direct what disposition, by sale or otherwise, shall be made of them, and, if sold, the proceeds of such sale shall be covered into the Treasury of the United States."

Also under the following provisions:

The Secretary of War is hereby authorized to issue, on the requisitions of the governors of the several States and Territories, or of the commanding general of the militia of the District of Columbia, such number of the United States standard service magazine arms, with bayonets, bayonet scabbards, gun slings, belts, and such other

necessary accouterments and equipments as are required for the Army of the United States, for arming all of the organized militia in said States and Territories and District of Columbia, without charging the cost or value thereof, or any which may have been issued since December first, nineteen hundred and one, or any expense connected therewith, against the allotment to said State, Territory, or District of Columbia, out of the annual appropriation provided by section sixteen hundred and sixty-one of the Revised Statutes, as amended, or requiring payment therefor, and to exchange, without receiving any money credit therefor, ammunition, or parts thereof, suitable to the new arms, round for round, for corresponding ammunition suitable to the old arms theretofore issued to said State, Territory, or District by the United States: *Provided*, That said rifles and carbines and other property shall be receipted for and shall remain the property of the United States and be annually accounted for by the governors of the States and Territories as now required by law, and that each State, Territory, and District shall, on receipt of the new arms, turn into the Ordnance Department of the United States Army, without receiving any money credit therefor and without expense for transportation, all United States rifles and carbines now in its possession. (Act of Congress, approved January 21, 1903; G. O. 7, A. G. O., 1903.)

For the purpose of furnishing the necessary articles requisite to fully arm, equip, and supply each regiment, battalion, squadron, company, troop, signal, engineer, and hospital corps and medical department of the organized militia of the several States, Territories, and the District of Columbia, with the same armament and equipment as are now prescribed for corresponding branches of the line or staff in the Regular Army without cost to the said States, Territories, or the District of Columbia, but to remain the property of the United States, and to be accounted for in the manner now prescribed by law, the Secretary of War is hereby authorized, under such regulations as he may prescribe, on the requisitions of the governors of the several States and Territories, or the commanding general of the militia of the District of Columbia, to issue the said armament and equipment to the organized militia. (Act of Congress approved March 2, 1903, G. O., 24, A. G. O., 1903.)

ISSUE OF ORDNANCE AND ORDNANCE STORES TO COLLEGES.

[G. O. 94, A. G. O., 1902.]

Issues of ordnance and ordnance stores to colleges are limited to arms and equipments and implements necessary to enable them to be used by the students for purposes of drill, parade, and similar exercises, but not for field and encampment purposes.

Only such ordnance and ordnance stores as are enumerated in the following paragraphs will be issued for the purpose of military instruction to each selected college and university having an officer of the Army stationed thereat.

The field pieces of artillery, with their carriages and implements, will be limited to the following, viz:

	Price each.
2 muzzle-loading wrought-iron rifled guns; caliber, 3 inches	\$450.00
2 carriages and limbers for 3-inch gun	325.00
2 gunner's sappersacks	8.50
2 trail handspikes	1.10
4 lanyards, new pattern (old pattern 10 cents) .....	.81
2 priming wires .....	.10
4 sponges and rammers, 3-inch	1.25
4 sponge covers, 3-inch .....	.21
2 tube pouches	1.50
4 thumb stails .....	.32
2 tompons, 3-inch .....	.46
2 vent covers .....	.16
1 pendulum hausse, 3-inch	1.70
1 pendulum-haussee pouch .....	.75
2 paulina, 12 by 15 feet	11.80

When, in the opinion of the Chief of Ordnance, the supply on hand will permit, there may be issued in lieu of the foregoing two of the 3.2-inch breech-loading steel field guns of the earlier models, with their carriages and implements, as above.

The small arms issued to any college will be the Springfield "cadet" rifles similar to those which were supplied the United States Military Academy at West Point, but in no case will the number of rifles issued be in excess of the number of male students in regular attendance and actually receiving military instruction.

The accouterments to be issued with the cadet rifles will consist of a bayonet scabbard, cartridge box, gun sling, waist belt, and waist-belt plate.

The service noncommissioned officer's sword can be issued for the use of the officers and noncommissioned officers of the corps of cadets. The sliding frog will enable these swords to be worn on the ordinary waist belt.

A limited number of cavalry sabers and belts (for purposes of instruction only) will be issued when satisfactory evidence of their necessity is presented.

Issue of the above stores will be made by the Chief of Ordnance to any selected institution upon its filing a bond in the penal sum of double the value of the property, conditioned that it will fully insure, take good care of, and safely keep and account for the same, and will, when required by the Secretary of War, duly return the same, within thirty days, in good order, to the Chief of Ordnance, U. S. Army, or such other officer or person as the Secretary of War may designate to receive them.

For practice firing the following allowances of ammunition will be made annually to each of the various institutions, viz: One hundred blank cartridges and 300 friction primers for 3-inch or for 3.2-inch breech-loading gun, as the case may be. Projectiles will not be issued for the field guns.

Ammunition for rifle target practice will be issued annually at the rate of 50 carbine ball cartridges (or their equivalent value in reloading material, reloading tools, or target supplies) for each cadet actually engaged in target practice, but there shall not be issued to any college more than 7,500 ball cartridges in any one year.

Where it is not deemed practicable to have target practice a limited quantity of rifle blank cartridges will be furnished for instruction in firing. This ammunition will be issued upon requisition to be forwarded to the Chief of Ordnance by the presidents or superintendents of the institutions; and as annual allowances date in all cases from July 1 of each year, requisitions should be forwarded before or as soon after that date as practicable for the current year's supply. Undrawn allowances of one year can not be drawn in the succeeding year.

When tools for reloading rifle cartridges or implements for casting lead balls for gallery practice have been issued to colleges, the parts required to keep them in good order may be issued when requested, and charged against the money value of the annual ammunition allowance.

All ordnance and ordnance stores issued to colleges must be kept insured by the college authorities for their full invoice value, as shown in the bond, and the Chief of Ordnance promptly informed when and where the insurance is placed.

The transportation of ordnance and ordnance stores from the Government arsenals to institutions of learning, and from institutions of learning back to Government arsenals, is always without expense to the United States.

The colleges to which issues of ordnance and ordnance stores are made, under bonds given as required by law, will be required to keep said property in like good serviceable condition as when issued by the Government, and for this purpose the spare parts, implements, and appendages necessary for this purpose will be sold to them at cost price on application to the Chief of Ordnance.

When ordnance and ordnance stores are returned to the Ordnance Department by any institution of learning they will be carefully examined when received at the arsenal, and if they are found imperfect or unserviceable by reason of carelessness or

other causes than legitimate use in service the damage will have to be made good to the United States.

The cost of all missing property must be made good to the United States.

When any of the ordnance or ordnance stores become unfit for use the president of the college will report the fact to the Chief of Ordnance, and he will authorize the college to send them to an arsenal without expense to the United States. On reaching the arsenal the property will be inspected by an officer of the Ordnance Department, and if its condition is found to be due to the ordinary incidents of service it may be replaced with serviceable stores of like character, but if its condition is found to be due to carelessness or other than legitimate causes the extent of damage or value of missing stores will be determined by the Chief of Ordnance and must be paid by the college before any new issue of stores is made.

The guns and carriages must not be allowed to remain out doors with only the paulins as a protection from the weather, but they must be housed in a suitable shed and habitually kept there except when used for drills or saluting purposes.

Regular property returns will be rendered semi-annually to the Chief of Ordnance by each president or superintendent of an institution supplied with arms, etc., accounting for all ordnance and ordnance stores issued to the institution under his charge. These returns will be made on the blank forms to be supplied by the Chief of Ordnance.

Failure on the part of any institution of learning to comply with the foregoing regulations, or any others that may be prescribed by the Chief of Ordnance for the care, preservation, or accountability of any ordnance or ordnance stores issued to it by the United States, will be considered sufficient cause for the prompt withdrawal by the Secretary of War of the Government property in its possession.

Whenever any institution shall fail to return the public property in its charge within thirty days after demand made by the Secretary of War, the delinquency will be peremptorily referred to the Attorney-General, that the bond of the institution may forthwith be put in suit.

Not to exceed six caliber .30 U. S. magazine rifles, six woven cartridge belts, caliber .30, and 1,000 rounds of either ball, reduced range, or blank cartridges will be issued to colleges and universities entitled under existing law to the issue of arms and ammunition, the issue to be made in accordance with existing rules and regulations.

The reloading material, reloading tools, and target supplies which can be drawn as part of the ammunition allowance for target practice are:

	Price each.
(a) Reloading materials, consisting of—	
Small-arms powder (black), per pound.....	\$0.18
Carbine bullets, cal. .45, per M.....	6.10
Round balls, cal. .45, per M.....	2.00
Cartridge primers, per M.....	1.07
(b) Reloading tools, consisting of—	
1 set of hand reloading tools (bench reloading tools are not issued to colleges).....	14.00
(c) 1 bullet mold, cal. .45, casting 4 balls.....	5.08
1 melting ladle.....	1.50
1 pouring ladle.....	.34
(d) Target supplies, consisting of—	
Paper targets:	
A, old model.....	.08
B, old model.....	.035
Centers for targets:	
A, old model.....	.0075
B, old model.....	.0225
Paper targets for gallery practice, old model.....	.01
Pasters, white and black, per box, old model.....	.10

A set of hand tools for reloading small-arm cartridges issued at the present time, principally to colleges and States, is composed of the following parts:

	Price.
1 combination anvil.....	\$0.75
1 brush wiper.....	.17
1 adjustable charger.....	.60
1 reloading and crimping die for rifle and carbine shell.....	1.55
1 reloading and crimping die for revolver shell.....	1.25
1 resizing die for rifle and carbine shell.....	2.00
1 resizing die for revolver shell.....	1.00
1 drift.....	.06
1 powder funnel.....	.10
1 mallet.....	.13
1 oiler.....	.06
1 priming tool with spindle and 6 pins.....	2.10
1 reloading punch for rifle shell.....	.60
1 reloading punch for carbine shell.....	.60
1 reloading punch for revolver shell.....	.50
1 resizing punch.....	.34
1 shell scraper.....	.15
1 wiping rod.....	.15
1 tool box and cotton waste.....	1.40
Total.....	14.00

Pendulum hausses and pouches for the 3-inch muzzle-loading rifle and the 6-pounder and 12-pounder S. B. guns are issued to schools and colleges only for use in connection with these guns.



CHAPTER XVII.

EQUIPMENTS.

(CLEANING MATERIALS FOR, ETC.)

EQUIPMENT FOR INFANTRY TROOPS.

The individual equipment of the infantry soldier (including company musician), with its weight, is as follows:

Articles.	Weight.	Price each.
	<i>Lbs. ozs.</i>	
1 United States Magazine rifle, caliber .30 (with bayonet), model 1896.....	10 2.088	\$14.27
1 blanket-roll strap.....		
1 waist belt (fair leather), (black leather, 42 cents).....		.60
1 waist-belt plate.....		.22
1 cartridge box (McKeever), fair leather.....		
1 bayonet scabbard.....	7	.60
1 cartridge belt, woven, with fastener, (fastener separate, 15 cents).....	1 3.25	1.75
1 canteen.....	13.75	.33
2 canteen-haversack straps (fair), 59 cents each, (black leather, 52 cents each)...	12	1.18
1 gun sling.....	5.25	.43
1 haversack.....	1 .50	.85
1 meat can.....	15	.19
1 tin cup.....	8.25	.10
1 knife.....	2.25	.04
1 fork.....	1.75	.04
1 spoon.....	1.50	.02
Total.....		

The individual equipment of the infantry noncommissioned staff soldier is as follows:

Articles.	Weight.	Price each.
	<i>Lbs. ozs.</i>	
1 noncommissioned officer's (musician's) sword.....	2 3.36	\$4.50
1 revolver, caliber .38.....	2 1	11.00
1 waist belt, noncommissioned officer's, fair leather, (black leather, 43 cents)...	10.65	.60
1 waist-belt plate, noncommissioned officer's.....		.41
1 sliding frog, noncommissioned officer's, fair leather, (black leather, 24 cents)...		.25
1 revolver belt, web.....		1.00
1 revolver holster, caliber .38, fair leather, (black leather, 63 cents).....	9.25	.95
1 blanket-roll strap.....		
1 canteen.....	13.75	.33
2 canteen-haversack straps (fair), 59 cents each, (black leather, 52 cents).....	12	1.18
1 haversack.....	1 .50	.85
1 meat can.....	15	.19
1 tin cup.....	8.25	.10
1 knife.....	2.25	.04
1 fork.....	1.75	.04
1 spoon.....	1.50	.02
1 revolver cartridge pouch (fair), (black leather, 57 cents).....	12.20	.60
Total.....		

The individual equipment of a member of the regimental band is as follows:

Articles.	Weight.	Price each.
	<i>Lbs. oza.</i>	
1 revolver, caliber .38.....	2 1	\$11.00
1 waist belt, noncommissioned officer's, fair leather.....	8.45	.50
1 waist-belt plate, noncommissioned officer's.....		.41
1 revolver holster, caliber .38, fair leather, (black leather, 83 cents).....	9.25	.95
1 revolver belt, web.....		1.00
1 blanket-roll strap.....		
1 canteen.....	13.75	.35
2 canteen-haversack straps (fair), 59 cents each, (black leather, 52 cents).....	12	1.15
1 haversack.....	1 .50	.85
1 meat can.....	.15	.19
1 tin cup.....	8.25	.10
1 knife.....	8.25	.04
1 fork.....	1.75	.04
1 spoon.....	1.50	.02
1 revolver cartridge pouch (fair), (black leather, 57 cents).....	12.20	.60
Total.....		

NOTE.—If the buckle be issued with waist belts instead of plate, cost of buckle is 10 cents each.

FENCING EQUIPMENTS FOR INFANTRY.

Fencing equipments are issued to the infantry. The following is the allowance for one company:

	Price each.
8 masks.....	\$5.00
8 plastrons.....	5.15
8 right hand gloves.....	2.50
8 left hand gloves.....	2.25
8 fencing bayonets.....	

Fencing equipments will be renewed from time to time as required. They are not expendable and must be submitted to an inspector before being dropped from property returns.

EQUIPMENT FOR COAST ARTILLERY TROOPS.

The equipment of the coast artillery soldier, company musician, noncommissioned staff, and members of the band, is the same as provided for the infantry under similar conditions.

EQUIPMENT FOR ENGINEER TROOPS.

The equipment of the engineer soldier, company musician, noncommissioned staff officer, and member of the band, is the same as provided for the infantry.

EQUIPMENT FOR ORDNANCE DETACHMENTS.

The equipment of soldiers of ordnance detachments are the same as provided for infantry.

EQUIPMENT OF ENLISTED MEN OF SIGNAL CORPS.

The equipment of the enlisted men of the Signal Corps is the same as that provided for cavalry, mounted. Carbine to be carried when prescribed.

EQUIPMENT FOR HOSPITAL CORPS.

The equipment of the Hospital Corps soldiers is that provided for the infantry without arms.

A modified cartridge shell is issued, consisting of the service shell with neck enlarged and head bored out; the bayonet is worn with the tang in this shell to prevent fraying of the belt.

CLEANING MATERIAL FOR INFANTRY TROOPS AND TROOPS EQUIPPED AS INFANTRY TROOPS.

The allowance of cleaning materials for infantry troops and troops equipped as infantry troops is two boxes of cleaning material per company per annum.

The contents of a box of cleaning material are:

	Weight.	Price each.
	<i>Pounds.</i>	
40 ounces scouring material (in box marked 1)		\$0.85
16 ounces leather polish (in box marked 2) ^a .....		.60
40 ounces whiting, compressed (in box marked 3) .....		.19
1 pint linseed oil (in can marked 4) .....		.29
2 quarts coeolic, No. 80, soft (in cans marked 5)		1.00
2 chamole skins		1.20
1 wire scratch brush .....		.35
2 button brushes		1.12
2 button sticks, wood		1.00
1 cleaning plate, sheet iron .....		.20
1 box containing materials		2.50
Total		9.80

^a There will be issued as part of the contents of the cleaning material box to all troops supplied with fair (russet leather) equipments, in lieu of the black leather polish, a box of "russet leather dressing." The box will be numbered 2 as now. To use the dressing the leather should first be thoroughly cleaned and then the dressing applied with a small cloth and well rubbed in. The allowance of this dressing will be 4 boxes per annum per company. There will also be issued for use with this class of equipments to each company per annum, 20 pounds of castile soap and 4 quarts of crown soap with 1 pound of sponge.

In addition to these items there is issued with each box three pounds of sal soda (.0069 cents per pound) for use in cleaning smokeless powder residue from the bores of rifles and carbines. One-half pound of the soda dissolved in 1 gallon of boiling water suffices to clean 400 rifles.

If quantities of cleaning material in excess of the allowance given in the supply table are required, the requisition or a letter accompanying the same should fully set forth the necessity for such additional material.

When making requisition for cleaning materials, require for only such contents of the "box of cleaning materials" as may be actually required. The "box for cleaning materials" is not expendable. A box is only issued to replace one condemned or reported as clearly unserviceable.

Rottenstone, tripoli, etc., are not issued to infantry troops or troops serving or equipped as infantry.

To avoid the difficulty and expense of numerous small issues post-ordnance officers should make requisitions annually for the supply of cleaning material required for issue to the companies.

Portable arm racks for troops are not issued to posts.

Revolving and spring punches are not issued to the infantry.

FOR ISSUE WITH THE NEW UNITED STATES MAGAZINE RIFLE, MODEL 1903.

A new design of woven cartridge belt, with suspenders, for field service is being procured by the Ordnance Department.

This belt contains nine pockets, each pocket holds ten cartridges packed in clips of five each. The suspenders enable the belt to be supported from the shoulder, and the canteen and haversack attached to the belt, doing away with the canteen-haversack straps.

The suspenders cross in the back but not in the front, relieving the chest from pressure.

Each pocket in the belt has a flap secured by a glove fastener, to prevent loss of cartridges. The belt will be provided with metal waist plate.

The belt and suspenders are khaki colored, and all metal parts of a color to conform to the button prescribed for the service uniform.

All cartridges for the new magazine rifle will be issued in clips. Experiments are being made now to determine a suitable bandolier in which the cartridges can be packed and issued. Each bandolier will have six pockets, each holding ten cartridges, to be made of light cloth and shaped to conform to the body. It can be carried over either shoulder, and the pockets will be placed so that the blanket roll will not bear on them. (Price of belt complete, about \$1.90.)

EQUIPMENT FOR CAVALRY SOLDIER.

The individual equipment of a cavalry soldier, noncommissioned staff officer, and member of a band, with its weight, is as follows:

Articles.	Weight.		Black leather, price each.	Fair leather, price each.
	Lbs.	ozs.		
1 carbine, caliber .30, model 1899.....	8	1.60	\$12.29	\$12.29
1 revolver, caliber .38.....	2	1	11.00	11.00
1 light cavalry saber.....	8	7.50	6.00	6.00
1 cartridge belt, cavalry, woven, caliber .30.....	1	5	1.90	1.90
1 saber belt (waist belt).....			.42	.50
1 saber belt plate (waist belt plate).....			.22	.22
1 saber belt slide and hook.....			.11	.11
1 saber attachment.....				
2 saber attachment slings.....			1.29	1.29
1 cartridge box (McKeever), fair leather.....				
1 pistol holster, caliber .38.....		9.25	.83	.96
1 saber knot.....		2	.52	.50
1 pair spurs, per pair.....		9.25	.74	.74
1 pair spur straps, per pair.....		2.50	.22	.25
1 carbine sling ^a				
1 canteen.....	1	.25	.83	.33
2 canteen-haversack straps, for dismounted service.....			.62	.59
1 canteen strap, cavalry.....			.21	.25
1 meat can.....		15	.19	.19
1 tin cup.....		8.25	.10	.10
1 knife.....		2.25	.04	.04
1 fork.....		1.75	.04	.04
1 spoon.....		1.50	.02	.02
Horse equipments:				
1 saddle, complete.....	16	15	14.31	16.36
1 pair saddlebags.....	4	4	5.06	5.90
1 saddle blanket, gray.....	4	4.25	2.70	2.70
1 surcingle.....		12	.69	.95
1 curb bridle, complete.....	2	7.75	4.00	4.32
1 watering bridle, complete.....	1	.75	1.18	1.33
1 halter, complete ^b	2	9.50	1.96	2.26
1 link.....			.23	.30
1 lariat.....	2	.75	.78	.74
1 carbine scabbard and straps (2).....	2	2	2.24	3.04
1 lariat strap with snap.....		1.75	.10	.11
1 picket pin.....	1	7.50	.36	.36
1 nosebag.....	1	2.75	.96	1.04
1 horse brush.....		10	.97	.97
1 currycomb.....		10	.22	.22
2 saber straps (saddle).....	1	15.25	.14	.15
1 stirrup with socket for guidon issued special.....			1.60	1.50
1 horse cover, blanket lined (issued only to troops stationed in extreme cold climates, and on special requisition).....	6	8	6.18	6.13
1 horse cover, cotton duck (issued on special requisition only).....			3.11	3.11

^a Issued to Engineer troops mounted only (see G. O. 98, also 1903.)

^b Halter straps expendable in repairs.

In hot and dry sections two canteens per man are issued upon the approval of department commanders.

Saddles are regularly supplied in three sizes in the following proportions:

- No. 1, 11-inch seat, 15 per cent.
- No. 2, 11½-inch seat, 50 per cent.
- No. 3, 12-inch seat, 35 per cent.

Cinches (girths) are supplied regularly in four lengths in the following proportions:

- 22 inches long, 15 per cent.
- 24 inches long, 50 per cent.
- 26 inches long, 20 per cent.
- 28 inches long, 15 per cent.

Surcingle are regularly supplied in three lengths in the following proportions:

- No. 1, length of webbing 50½ inches, billet 30½ inches.
- No. 2, length of webbing 66 inches, billet 18 inches.
- No. 3, length of webbing 66 inches, billet 30 inches.

The regulation curb bit (Ordnance Department), which is now nickel plated, is issued in four sizes, determined by the mouthpiece, in the following proportions:

- No. 1, length of mouthpiece 4½ inches, 15 per cent.
- No. 2, length of mouthpiece 4½ inches, 75 per cent.
- No. 3, length of mouthpiece 5 inches, 10 per cent.
- No. 4, length of mouthpiece 5½ inches, is issued only when specially called for.

If different sizes from the above are required the requisition should so state and clearly set forth how many of each size of any given article are required.

Shoemaker bits are obsolete and are no longer issued to the service. "Curb bits" when required will be understood to mean 1892 bits.

Girths or quarter straps are now made self-adjusting, but the old pattern straps can only be replaced when unserviceable.

Bridles are supplied without bits when so called for.

Halter chains are issued for use at posts when specially requested.

The cavalry link has been modified, supplying a stronger strap and snap.

Fencing equipments are issued to the cavalry in accordance with the following allowance for a troop of cavalry:

	Price each.
8 masks.....	\$3.55
8 plastrons.....	4.00
8 right-hand gloves.....	2.20
8 single sticks {blade, 12.....	.30
{basket, 18.....	
8 wooden sabers {blade, 36.....	.80
{guard, 44.....	

Wooden saber blades and single-stick blades are supplied for repairs as required.

Fencing equipments are not expendable and must be submitted for inspection as provided by the regulations.

SADDLER'S TOOLS.

One pair of saddler's tool bags are issued to each troop of cavalry. These bags contain all the articles in the set for cavalry saddler's tools, except the stitching clamp.

A set of cavalry saddler's tools consists of:

	Price each.		Price each.
12 awls, stitching, assorted	\$0.06	1 oilstone	\$0.60
6 awl handles, plain	.17	1 pliers, 6-inch	.60
1 awl handle, patent	.17	1 pricking carriage, 3 wheels, 7, 8, and 10	1.09
1 awl seat, handled	.23	1 revolving punch, 4 tubes, 4, 6, 6, and 7	.60
1 awl, stub	.16	3 punches, hand, 7, 8, and 10	.60
1 awl, peg	.09	1 punching block, lead	.50
1 edge tool No. 2	.15	1 rule, 2 feet, 4 fold	.12
1 edge tool No. 1	.15	1 rivet set with 2 holes	.30
1 claw tool	.30	1 rivet iron	.36
1 pair compasses, common, 6-inch	.24	1 sandstone	.05
2 creasers, wood	.20	1 slicker, steel, with wooden handle	.75
1 gauge, draw	1.20	1 screw-driver, 3-inch	.19
1 hammer, riveting	.35	1 tuckler	.30
1 hammer, saddler's	1.00	2 thimbles	.10
1 knife, half round, 5-inch	1.06	1 stitching clamp	.77
1 head knife	.67	1 stitching horse	3.55
2 knives, shoe	.20	1 driving punch, No. 5	.09
1 knife, splitting, 6-inch	8.56	1 sewing palm	.72
1 mallet, 14 to 16 inches	.14	1 pair shears, 6-inch blade	.50
6 papers needles, harness, Nos. 4, 5, and 6	a .0625	2 leather tool bags (pair)	b 15.40
1 paper needles, glover's, No. 3	a .065		
1 pair nippers, cutting	1.80	Total (without driving punch)	41.95

a Per paper.

b Per pair.

Cleaning materials for cavalry.

[Allowance per troop per annum.]

[All expendable.]

	Price each.
10 quires of emery cloth, No. 90, per quire	\$0.42
4 quires of emery cloth, No. 120, per quire	.42
4 quires of emery cloth, No. 00, per quire	.42
10 pounds of rottenstone	.04
20 pounds of harness soap, per pound	.14
6 gallons of sperm oil, per gallon	.96
2 boxes of cleaning material containing each:	
40 ounces scouring material (in box marked 1)	
16 ounces leather polish (in box marked 2)	
40 ounces whiting, compressed (in box marked 3)	
1 pint linseed oil (in can marked 4)	
2 quarts camellia, No. 80, soft (in cans marked 5)	
2 chamols skins	
1 wire scratch brush	
4 button brushes	
4 button sticks, wood	
1 cleaning plate, sheet iron	
1 box containing materials	
3 pounds of sal soda is issued with each box of cleaning material for use in cleaning bores of carbines. (See infantry cleaning material, page —.)	

For prices see page 627.

The following cleaning material for fair leather, constituting a six months' supply, is issued to each troop of cavalry:

[All expendable.]

	Price each.
25 pounds of castile soap, per pound	\$0.062
10 gallons of neat's-foot oil, per gallon	.60
6 quarts of crown soap, per quart	.83

To keep fair leather equipments in serviceable condition, and avoid their rapid deterioration, they should be frequently cleaned, in accordance with instructions contained in Circular No. 25, Adjutant-General's Office, 1901.

Putz pomade and Miller's harness soap are not issued to cavalry.

Saddler's materials for one troop of cavalry.

[Six months' supply.]

[All expendable.]

	Price each.
5 pounds shoe thread, No. 3, per pound	\$0.80
5 pounds shoe thread, No. 10, per pound .....	.80
40 yards blue linen webbing, $\frac{3}{4}$ inches wide .....	.064
2 pounds rivets and burs, brass, $\frac{1}{4}$ -inch, No. 12 .....	.17
2 pounds rivets and burs, brass, $\frac{1}{4}$ -inch, No. 10 .....	.17
2 pounds rivets and burs, brass, $\frac{1}{4}$ -inch, No. 8 .....	.17
2 gross screws, brass, $\frac{1}{4}$ -inch, No. 6 .....	.48
3 papers tacks, iron, 6-ounce .....	.11
2 papers tacks, iron, 8-ounce .....	.11
2 papers tacks, iron, 12-ounce .....	.11
2 papers tacks, iron, 18-ounce .....	.11
60 buckles, brass bar, $\frac{1}{4}$ -inch .....	.084
20 buckles, brass bar, $\frac{1}{4}$ -inch .....	.086
10 buckles, brass bar, Saalbach, $\frac{1}{4}$ -inch .....	.085
20 buckles, brass bar, $\frac{1}{4}$ -inch .....	.04
60 buckles, brass wire, $\frac{1}{4}$ -inch .....	.01
40 buckles, iron bar, $\frac{1}{4}$ -inch .....	.02
20 buckles, iron bar, $\frac{1}{4}$ -inch, tongueless .....	.02
20 buckles, iron bar, $\frac{1}{4}$ -inch .....	.02
20 buckles, iron roller, $\frac{1}{4}$ inch .....	.075
20 buckles, iron roller, $\frac{1}{4}$ inch .....	.01
20 buckles, iron roller, $\frac{1}{4}$ inch .....	.02
20 buckles, iron roller, $\frac{1}{4}$ inch .....	.02
20 buckles, iron roller, $\frac{1}{4}$ inch .....	.025
20 brass rings, $\frac{1}{4}$ inch .....	.07
40 brass wire double hooks .....	.02
40 brass wire end hooks .....	.02
20 brass wire D rings .....	.015
40 brass squares, wire, $\frac{1}{4}$ inch .....	.01
40 iron rings, $\frac{1}{4}$ inch	1.18
20 iron rings, $\frac{1}{4}$ inch .....	.11
20 halter bolts .....	.01
20 halter squares .....	.02
20 brass foot staples, high .....	.02
20 brass foot staples, low .....	.02
20 brass foot staples, semicircular .....	.02
2 gross screw pins, brass, $\frac{1}{4}$ inch, per gross	2.25
40 ovals for saddles .....	.01
20 ovals for saddlebags .....	.01
20 lariat strap hooks .....	.02
20 lariat strap snap hooks .....	.06
20 link snap hooks .....	.06
20 saddlebag studs .....	.08
20 halter swivel rings .....	.0325
8 saddle shields, $1\frac{1}{4}$ inch .....	.01
10 saddle shields, $1\frac{1}{4}$ inch .....	.01
7 saddle shields, $1\frac{1}{4}$ inch .....	.01
20 bridle ornaments, complete .....	.04
24 saddle nails, japanned, per doz .....	.19
150 pounds harness leather, fair, \$25c; black, 47c, per pound	
5 sides bridle leather ^a	5.18
3 sides rawhide	1.86
3 pounds black wax, summer or winter prepared .....	.10
2 pounds beeswax .....	.86
2 boxes leather blacking (ingredients of each box sufficient for 2 quarts of blacking) .....	.18
3 gallons harness oil	1.04
3 gallons Lebrick's leather oil	2.60
20 awls, stitching, assorted .....	.06
10 handles, plain .....	.17
2 papers needles, harness, No. 5 .....	.0625
2 papers needles, harness, No. 6 .....	.0625
2 papers needles, gloves, No. 3 .....	.025
2 needles, collar, No. 4 .....	.11
2 needles, collar, No. 4 $\frac{1}{2}$ .....	.11

^a Fair leather; black leather, \$4.68 per side.

Portable forges are issued to the cavalry for field service, one to each troop.
One portable forge complete comprises:

	Price each.		Price each.
1 portable forge.....	\$22.00	1 hardie.....	\$0.40
1 forgechest.....	7.50	1 clinching iron.....	.40
1 hammer, hand.....	.54	1 toe knife.....	.12
1 hammer, shoeing.....	.28	1 fire rake.....	.10
1 fore punch and creaser.....	.78	1 fire shovel.....	.50
1 chisel, handled.....	.60	1 shoeing rasp.....	.34
1 vise.....	4.75	1 chest for anvil and block.....	4.00
1 tongs.....	.65	1 anvil.....	7.50
1 shoeing pincers.....	.58	1 anvil block.....	2.65
2 shoeing knives.....	.25	1 apron.....	1.38
1 wrench, screw, 10-inch.....	.46	1 shoeing box (leather).....	2.30
1 file, 12-inch, flat, bastard.....	.134	1 bucket, iron.....	.95
1 nail punch.....	.10		
1 pritchel.....	.20	Total.....	\$60.094

All articles necessary for the maintenance of this equipment will be provided by the Ordnance Department. (Par. 3, G. O. No. 23, A. G. O., 1896.)

Horse and mule shoes and nails will be provided by the Quartermaster's Department. (A. R., 1181.)

Smiths' tools and materials for their service, except the smiths' tools for forge and battery wagons and portable forges issued to the cavalry, will be provided by the Quartermaster's Department. (A. R., 1181.)

Files and pliers are not on the cavalry supply table and are not issued by the Ordnance Department for use of cavalry troops.

The materials enumerated in the supply tables for cavalry here given are all expendable, but should only be dropped on property returns as expended when actually used. In making requisitions for supplies, the amounts on hand must in all cases be stated. If none on hand, that fact should be stated.

Materials should be called for only when needed and in accordance with the units of and only such articles as given in the supply tables herein. In case of special requisitions for supplies in excess of the authorized allowance, the necessity for the demand should be fully set forth, showing also the period for which they are required.

Before forwarding requisitions they should be referred to the post ordnance officer for issue of such stores as may be on hand, such reference being noted on the requisition.

Bristles are not issued to cavalry.

Burnishing ink is not issued to the service.

Requisitions for ordnance stores to replace those condemned will be accompanied by a certified copy of the inspection report, but issues may be made before condemnation on requisition and the officer's statement that the stores are immediately needed for the proper equipment of his command, and that the articles are to replace unserviceable stores, but if required to replace those lost or damaged by the carelessness of men, the officer will certify that he has charged the cost of the same on the muster and pay rolls. (A. R., 1703.)

Equipments and ordnance stores which are strong and serviceable will not be condemned or replaced merely because they are unsightly or do not conform to the most recent requirements. (G. O. No. 11, 1889.)

In making requisitions the new form only (Form 22, October 11, 1902) should be used.

Side lines, and carbine slings and swivels are not issued to the service.

Curb chains have been substituted for curb straps. Price of chain 36 cents each.

Russet leather equipments have been adopted as the service equipment, and will take the place of the black equipment as rapidly as the present supply of the latter is exhausted. Black leather equipments should not be condemned merely to effect

an exchange, but continued until rendered unserviceable. Such troops as have 60 per cent or more of the old black equipment unserviceable can effect an exchange to the new equipment upon submission of proper requisition, accompanied by inspection reports, as provided by the regulations.

The waist belt with saber attachment is issued to the mounted service in lieu of the saber belt. Hasps are no longer riveted to the belt, but are issued with the belt plates. (Par. No. 2, G. O. No. 54, A. G. O., 1900.)

Brass and leather parts for the repair of equipments are supplied by the Ordnance Department.

Whenever canteens become unserviceable, because of worn-out covers or lost corks they will not be presented for condemnation, but will be repaired by the troops. Timely requisition will be made on the Ordnance Department for extra covers, corks, etc., with which to repair them. (A. R., 1719.)

Officers responsible for property will be held pecuniarily responsible for the losses of revolvers and small arms occurring in the service in all cases in which it can not be shown clearly that every possible precaution was taken. (Cir. 13, Apr. 4, 1902.)

All surplus horse equipments above the authorized strength of the troop, except five extra, which may be retained, will be turned in; those in the United States to Rock Island Arsenal, Rock Island, Ill.; those in the Division of the Philippines to the Manila Ordnance Depot, Manila, P. I. (G. O. 42, A. G. O., 1902.)

Hand guards with sight-protecting shoulder for U. S. magazine carbines, caliber .30, should be required in all cases where these have not already been provided. (G. O. 42, A. G. O., 1902.)

Haversacks when merely soiled or greasy must not be condemned for that cause, but should be washed at the post. Portions of the equipment rendered unserviceable by the loss of minor parts should be repaired at the post. Timely requisition should be made for buckles, rings, straps, and the necessary tools and materials for repairs. (Par. 4, Cir. 5, A. G. O., 1892.)

Equipments such as blanket bags, canteens, haversacks, etc., which, due to changes in the organizations and the transfer of enlisted men, are not correctly marked, will be used until they become unserviceable, when they will be replaced by new equipments. (Cir. 33, A. G. O., 1901.)

"H and H" cleaning material, made up into cakes, is issued to the service for cleaning gray cartridge belts. The allowance is one-half cake per belt for a six months' supply. (G. O. 104, A. G. O., 1902.) (Price 10c. per cake.)

Gray belts (woven), infantry and cavalry, have been adopted as the service belts for use in drills, target practice, maneuvers, on marches and in the field, and are now issued, but the blue belts in the service will not be replaced as long as they are serviceable.

Fasteners are issued with each belt, infantry and cavalry. Extra fasteners are supplied as required.

Leather waist belts and McKeever cartridge boxes (fair leather) are issued to the service for use at reviews, inspections, and other ceremonies under arms, and for duty under arms in garrison. (G. O. 81, A. G. O., 1902.)

The substitution of buckles for waist belt plates is under consideration.

All the later manufacture of woven cartridge belts, caliber .30, are provided with an eyelet to be used for the purpose of fastening the first-aid package. For the belt worn by the infantry it is in the center of the rear of belt; for that of the cavalry on the left side in the center of the first nine loops.

The same pattern strap is now issued for both canteen and haversack.

The cavalry belt, caliber .30, woven, differs from the infantry belt in that additional loops for 12 revolver cartridges, caliber .38, are attached on the right end of the belt and a brass wire loop is sewed on the lower edge of the belt on the left side, into which the saber attachment is hooked.

The three outer and upper loops for revolver ammunition on the cavalry cartridge belt will not be used while in service on long marches. (Cir. 10, A. G. O., 1896.)

A new padlock has been adopted for arm racks. The new lock is provided with keys more certainly not interchangeable. These locks will be issued on requisition in exchange for old locks.

Intrenching knives and scabbards are obsolete and not issued.

Whatever amount of ammunition may be carried in the cartridge belt, caliber .30, the cartridges should be arranged so as to fill both the corresponding outer and inner loops.

MARKSMAN'S INSIGNIA.

The following marksman's insignia are issued to the cavalry and infantry:

	Price each.
Sharpshooter's badge	\$1.00
Silver bars for sharpshooter's badge .....	.45
Marksmen's pins .....	.40
Marksmen's buttons .....	.07
Expert rifleman's badge	

The various insignia become the property of the sharpshooter or marksman. (F. R. S. A., 454.)

Requisitions for silver bars for sharpshooter's badges must state the years of qualification. (Par. 453, F. R. S. A., 1898.)

Requisitions for marksman's insignia to replace those lost or that have become unsightly from long wear must in all cases be accompanied by the official certificate of the company commander that such loss or deterioration was not due to the negligence of the soldier. Issues for new ones will not be made without this evidence. (Par. 454, F. R. S. A., 1898.)

Duplicate marksman's insignia for use on separate coats will be sold to those entitled to wear them. (Par. 454, F. R. S. A., 1898.)

Marksmen's insignia are issued to and accounted for by the inspector of small-arms practice.

COMPETITION PRIZES.

[G. O. 65, A. G. O., 1903.]

For department competition, rifle or carbine, infantry and cavalry.

To the members of the department team the following prizes will be awarded: First prize, a gold medal; second prizes, a silver medal to the next three in order of merit of the team; third prizes, a bronze medal to each of the remaining eight members of the team; provided, that should the number of competitors be less than 40 and more than 28, one gold, three silver, and six bronze medals will be awarded; if the number of competitors be less than 29 and more than 20, one gold, two silver, and five bronze medals; if the number of competitors be 20 or less, one gold, one silver, and four bronze medals will be awarded. These medals, and such others as may be won in the other regular competitions or matches, may be worn on all dress occasions. The winners will not part with them without authority from the War Department, but will preserve them, subject for inspection at any time.

The winner of a gold medal in a department or other authorized competition may, if he so elects, receive in lieu thereof a rifle or carbine of special design and superior workmanship, provided with the most improved sights, which will become his personal property, but which will not be used in competitions with men using the service rifle or carbine.

Army infantry and cavalry competition.

To the members of the army infantry or cavalry team in the order determined by the competition the following prizes will be awarded: First prize, a gold medal;

second prizes, to the next three members of the team, silver medals; third prizes, to the remaining eight members of the team, bronze medals.

For departmental pistol competition.

To the members of the department team thus selected the following prizes will be awarded: First prize, a gold medal; second prizes, a silver medal to the next three in order of merit of the team; third prizes, a bronze medal to each of the remaining eight members of the team; provided, that should the number of competitors be less than 40 and more than 28, one gold, three silver, and six bronze medals will be awarded; if the number of competitors be less than 29 and more than 20, one gold, two silver, and five bronze medals; if the number of competitors be 20 or less, one gold, one silver, and four bronze medals will be awarded. These medals, and such others as may be won in the other regular competitions or matches, may be worn on all dress occasions. The winners will not part with them without authority from the War Department, but will preserve them subject to inspection at any time. The winner of a gold medal in a department or other authorized competition may, if he so elects, receive in lieu thereof a pistol of special design and superior workmanship, provided with the most improved sights, which will become his personal property, but which will not be used in competitions with men using the service pistol.

ARMY PISTOL COMPETITION.

To the members of the army pistol team, in the order determined by the competition, the following prizes will be awarded: First prize, a gold medal; second prizes, to the next three members of the team, silver medals; third prizes, to the remaining eight members of the team, bronze medals.

The prize medals or arms for competitions are manufactured by the Ordnance Department, United States Army, and issued to the department inspectors of small-arms practice for distribution upon requisition submitted in accordance with regulations. The medals which remain the property of the United States will be carried in the ordnance property papers of the command of which the winner is a member. If a rifle or pistol of special design be received instead, the receipt of the winner will be required as a voucher to the property papers of the officer issuing same.

MARKING AND STENCIL OUTFITS FOR INFANTRY, CAVALRY, AND ARTILLERY.

One marking and stencil outfit is issued to each company of infantry, coast artillery or engineers, troop of cavalry, or battery of field artillery.

A marking outfit comprises:

	Price each.
Marking outfit:	
1 stamp (artillery, cavalry, or infantry)	\$1.06
1 stamp holder .....	.55
2 thumbcrews .....	.04
1 company, troop, or battery letter .....	.05½
19 figures and 1 blank .....	.03
1 brass mallet .....	.49
1 ink pad .....	.05½
4 ounces indelible ink .....	.09
1 inking stick .....	.02
1 packing box .....	.43
1 glass bottle, ground glass stopper .....	.10½
Total	2.53
A stencil outfit comprises:	
1 stencil plate of sheet brass, with coat of arms of the service, number of regiment, and letter of company .....	.75
10 metal stencil plates, Nos. 0 to 9 .....	.16½
1 stencil brush .....	.15
1 box of stencil paste .....	.08
1 packing box .....	.16½
Total	1.31

Stencil letters are not included in a stencil outfit and are not issued unless specifically called for.

ETCHING OUTFIT.

There has been adopted and is issued to the service an etching outfit to mark metal articles of equipment to take the place of the old method, metal tags with wire fastening. One outfit is deemed sufficient for one year's supply.

An etching outfit comprises:

1 bottle of etching acid.

240 stencil papers.

Price per set, \$3.30.

The stencils are made of mimeograph stencil paper. The following instructions for the use of the etching outfit should be followed:

Apply the stencil to the article to be marked by placing the coated surface of this paper next to the surface of the article, it adhering to the surface by being slightly warm from the hand. The acid is then applied over the letter cut in the stencil with the stopper of the acid bottle, the acid remaining about three minutes, after which it is washed off by dipping in cold water. By drying the stencil with blotting paper it can be used a number of times before being worn out.

Padlocks are only issued for arm racks and chests originally issued with locks. Requisitions should state clearly the purpose for which padlocks are required.

Halter straps are expendable in the repair of saddles, bridles, halters, or harness. Abstracts of expenditures should state purpose for which used.

OFFICERS' HORSE EQUIPMENTS, SABERS, SADDLECLOTHS, ETC.

The service accouterments and horse equipments required by an officer for his own use in the public service may be sold to him by the Ordnance Department at the regulation price. Ordnance supplies thus sold to officers will not be disposed of to persons not in the military service. (A. R., 1704.)

When the equipments authorized to be purchased in the preceding paragraph can not be obtained from an ordnance officer, officers may take from those for which they are accountable such articles as they require for their personal use or may furnish them to officers of their commands for like purpose. In such cases they will refund the cost of the articles to the Ordnance Department by depositing the money with an assistant treasurer or an authorized depository and taking and transmitting the customary certificates. (A. R., 1705.)

The equipments referred to in the foregoing paragraphs can be obtained upon application to any arsenal. It is preferable, however, that applications be made to Rock Island Arsenal, where most of the articles enumerated in the list given in the succeeding paragraph are manufactured.

The articles of horse equipment, sabers, etc., for sale to officers is as follows:

Articles.	Weight.	Price.	
		Black leather.	Fair leather.
Saddle:			
Saddle tree—	Lbs. ozs.		
Rawhide cover		\$7.43	\$8.30
Leather cover			
Coat straps, 6, at 12 cents each for black leather and 15 for russet .....		.72	.90
Cincha		1.31	1.43
Quarter straps, self-adjusting, complete		1.92	2.12
Stirrups, wood, without hoods, 2, at 30 cents each .....		.60	.60
Stirrup hoods, fair leather, 2, at 57 cents each; black leather, 72 cents each		1.14	1.44
Stirrup straps, fair leather, 2, at 57 cents each; black leather, 71 cents each		1.14	1.42
Total		14.31	16.26

Articles.	Weight.	Price.	
		Black leather.	Fair leather.
Curb bridle:	Lbs. ozs.		
Curb bit, nickeled.....		\$1.45	\$1.45
Headstall—			
Crownpiece.....	Black. Fair.		
Check piece, 2, fair, 41 cents; black, 51 cents.....	\$0.18 \$0.24		
Throatlatch.....	.16 .20		
Brow band (without ornaments).....	.10 .15		
Brow-band ornaments, 2, at 3 cents each.....	.06 .08		
Curb chain.....		1.12	1.47
Curb chain safe.....		.86	.96
Reins.....		.14	.14
		.87	.88
Total.....		4.00	4.30
Watering bridle:			
Watering bit, nickeled.....		.44	.44
Double snaps, nickeled, 2, at 7 cents each.....		.14	.14
Reins.....		.60	.76
Total.....		1.18	1.33
Halter:			
Halter headstall.....		1.56	1.89
Halter strap.....		.41	.49
Total.....		1.96	2.38
Currycomb.....		.22	
Horse brush.....		.97	
Lariat.....		.78	
Lariat strap.....		.10	.11
Nowebag.....		.96	1.04
Picket pin.....		.36	
Saddle blanket, gray.....		2.70	
Saddle blanket, red.....		2.70	
Saddlebags, complete, pairs.....		5.05	5.90
Side straps for saddlebags.....		.20	
Sureingles.....		.69	.86
Officers' spurs:			
Spurs, pair (white metal).....		.86	.86
Spur straps, with white metal buckles (10 cents each), 2, fair leather, at 26 cents each; black leather, at 26 cents each.....		.52	.52
1 pair complete.....		1.38	1.38
Officers' saber.....		11.00	
Chamois-skin case for officer's saber.....		.75	
Pistol holsters, caliber 0.38.....		.58	.96
Pistol holsters for Colt's automatic pistols.....			.83
Pistol holsters for Luger's automatic pistols.....			.88
Officers' box spurs:			
Box spurs, with rowells (2).....		.60 cents each..	\$1.20
Boxes for box spurs (2).....		.50 cents each..	1.00
One pair complete.....			2.20
Horse furniture:			
Breast strap and martingale for line officer.....			6.20
Breast strap and martingale for staff officer.....			5.70
Housing for general officer, without insignia.....			23.00
Housing for brigadier-general, with insignia.....			27.11
Housing for major-general, with insignia.....			27.92
Dress saddle cloths:			
General officers, without insignia.....			6.60
Officer of the staff corps, without insignia.....			5.70
Officer of the Engineer Corps, without insignia.....			5.75
Officer of the Artillery Corps, without insignia.....			4.15
Officer of cavalry or infantry, without regimental figures.....			4.15
Officer of cavalry or infantry, with regimental figures (2).....			4.40
Chaplain serving with cavalry, infantry, or artillery, without insignia.....			4.15
Service saddle cloths:			
Without ornaments or figures.....			3.00
With regimental figures for cavalry or infantry.....			3.25

Insignia and ornaments.	Gold or silver plated and enameled.	Bronze.
Insignia for saddlecloths:		
Adjutant-General's Department.....per pair..	\$1.14	\$1.14
Inspector-General's Department.....do.....	1.42	1.42
Judge-Advocate-General's Department.....do.....	1.14	1.14
Quartermaster's Department.....do.....	1.69	1.23
Subsistence Department.....do.....	.86	.86
Medical Department.....do.....	.86	.86
Pay Department.....do.....	.86	.86
Corps of Engineers.....do.....	1.14	1.14
Ordnance Department.....do.....	.86	.86
Signal Corps.....do.....	1.69	1.12
Artillery Corps, field or coast.....do.....	1.69	1.32
Chaplains.....do.....	.86	.86
Ornaments for saddlecloths:		
General officers, coat of arms.....do.....	\$1.30	.....
Aid-de-camp.....do.....	1.58	.86
Stars for general officers.....do.....	.81	.81
Officers' saber belt (undress):		
Saber belt, field service, without plate or buckle (russet leather).....		\$0.50
Saber-belt buckle.....		.10
Slide.....		.11
Saber attachment and slings.....		1.29

Housings for general officers' saddles and the saddlecloths for officers are not kept on hand, but are made for sale to officers as ordered by them, and charged at the cost of fabrication. The cost here given is an average price. In the price of horse furniture is included 50 cents for packing box.

Any of the articles named in the previous paragraph can be sent by freight through the Quartermaster's Department. If shipped by express the purchaser must pay the charges.

Martingales and breast straps are not included in officers' horse equipments and are made only when specifically requested.

Dispatch cases will be manufactured and sold to officers upon their personal requisition. Likewise puttee leggings and box spurs.

Whitman saddles are sold to officers upon request at a cost of \$13.88 each.

Horse equipments will be sold by the Ordnance Department to infantry officers, on their application, for their personal use.

Component parts of equipment.

	Black leather, price each.	Fair leather, price each.
Canteen:		
1 canteen body.....		
1 chain.....		
1 cork.....		
1 cover, canvas duck.....		
1 cover, felt.....		
Haversack:		
1 flap and back, canvas.....		
1 front, canvas.....		
1 russet, canvas.....		
1 knife-and-fork pocket.....		
1 meat-can pocket.....		
1 coffee bag.....		
1 sugar bag.....		
1 salt bag.....		
1 bacon bag.....		
1 knife-and-fork scabbard.....		
1 brass-wire buckle, 1-inch.....		
2 brass-wire D rings, 1-inch.....		
Canteen haversack strap:		
1 body.....		
2 double brass-wire hooks.....		
2 brass hooks, end.....		

Component parts of equipment—Continued.

	Black leather, price each.	Fair leather, price each.
Waist belt (complete):		
1 belt body		
1 brass hasp		
1 belt plate		
Saber attachment:		
1 brass slide		
1 snap hook, brass		
1 short strap, leather		
1 long strap, leather		
2 buttons, brass		
2 buckles, brass wire, 1½-inch		
2 snap hooks for saber or sword (for officers' belts only)		
Artillery knapsack:		
1 body		
2 reinforce pieces		
4 pocket straps		
4 pocket-strap buckle pieces		
2 knapsack straps		
1 knapsack handle		
4 loops, leather		
2 ½-inch wire buckles		
6 ½-inch wire buckles		
Gun sling:		
1 body, leather		
1 button, brass		
1 hook, brass		
Meat can:		
1 body		
1 plate or lid		
1 handle		
1 rivet for handle		
Cavalry saddle:		
1 tree		
1 rawhide cover		
1 leather cover		
6 coat straps, each—		
1 body, leather		
2 brass bar buckles, 1-inch		
2 stirrup straps, each—		
1 body, leather		
2 iron bar buckles, 1½-inch		
2 stirrups, wood		
2 stirrup hoods, leather		
1 stirrup-hood guidon (special)—		
1 socket		
1 body		
2 straps		
1 cincha—		
1 body, hair		
1 cincha safe and cover (leather)		
2 4-inch iron rings		
1 cincha strap (rawhide)		
1 quarter strap—		
1 front and rear strap		
2 safes		
2 4-inch rings		
4 saddle nails, japanned		
2 brass foot staples, high		
4 brass foot staples, low		
2 brass foot staples, semicircular		
4 brass rings, 1½-inch		
1 brass shield (11, 11½, or 12)		
7 brass ovals		
1 saddle-bag stud		
17 brass screw pins, 1-inch		
18 brass screws, 1-inch, No. 6		
Curb bridle:		
Headstall—		
1 curb bit		
1 crown piece		
2 cheek pieces		
1 throat lash		
1 brow band		
2 brow band ornaments		
1 curb strap or chain		
1 rein		
Watering bridle:		
1 bit		
2 snaps		
1 rein		

Component parts of equipment—Continued.

	Black leather, price each.	Fair leather, price each.
Halter:		
2 cheek pieces		
2 iron loops		
2 iron rings, 1½ inches		
1 crown piece		
2 iron bar buckles		
1 nose band		
1 chin strap with 2 standing and 2 sliding loops		
1 throat strap		
1 halter bolt for throat strap		
1 throat band		
1 halter square, 1½-inch		
1 halter strap		
1 iron bar buckle without tongue		
Saddlebags (pairs):		
2 pouches		
1 seat		
2 pouch linings		
4 buttons		
1 coffee bag		
1 sugar bag		
1 salt bag		
8 brass buckles, ½-inch		
Sureingle:		
1 blue linen webbing		
1 iron roller buckle, 1½-inch		
1 chape with standing loop		
2 leather loops		
1 billet, leather, 1½-inch		
Link:		
1 body		
1 snap hook		
1 brass bar buckle		
1 billet with sliding loop		
Lariat:		
1 piece of rope, 25 feet long, ½ inch diameter		
2 iron rings, 1½ inches diameter		
1 snap hook		
Picket pin:		
1 iron pin, ½ inch diameter		
1 swivel and ring		
Nosebags:		
1 body, cotton duck with leather bottom		
1 head strap		
1 small strap with standing loop		
1 iron roller buckle		
Spur straps:		
1 strap with standing loop		
1 brass-wire buckle, ½-inch		

Dimensions of leather parts of cavalry-horse equipments.

Articles.	Num-ber.	Width.	Length.			Buckles.	
			Out.	Fin-ished.		Num-ber.	Width.
Saddle:							
Girth straps—		Inches.	Inches.	Inches.			Inches.
Front	1	14	43	38			
Rear	1	14	44	39			
Girth-strap safes	2	6½	5	5			
Cincha straps	2	14	60	57½			
Coat straps	6	6	25	38	6		
Coat-strap stops	6	6	6	6			
Stirrup straps	2	14	56	53	2	1½	
Stirrup-strap loops	2	14	5	14			
Stirrup hoods	2	14½	94	94			
Cincha safes	2	6½	64	64			
Cincha covers	2	7½	34				
Saber straps	2	6	15	12	2		
Saber-strap loops	2	6	2½	1			
Carbine boot—							
Body	1	12	19½	13½			
Gusset	1	2½	1½				
Suspension straps	1	1	17	17			

Dimensions of leather parts of cavalry-horse equipments—Continued.

Articles.	Number.	Width.	Length.		Buckles.	
			Cut.	Finished.	Number.	Width.
Saddle—Continued.						
Carbine boot—Continued.		Inches.	Inches.	Inches.		Inches.
Top strap	1	19	19	17	1	
Bottom strap	1	15	15	14	1	
Top and bottom strap loops	2	2	2	2		
Saddlebags:						
Seat	1	10	19	18		
Key straps	2	8	8	8		
Front	2	12	11	11		
Back	2	12	12	12		
Gusset	2	4	25	25		
Flap	2	13	8	8		
Flap billets	6	13	13	13		
Chape	6	8	8	1	6	
Chape reinforce	6	1	1	1		
Chape loops	6	2	2	2		
Wells, long	2	31	31	31		
Wells, short	2	26	26	26		
Linings—						
Front	2	12	12	11		
Back	2	12	12	11		
Gusset	2	4	26	26		
Pockets	2	11	9	8		
Sugar and coffee bags	1	8	9	7		
Salt bags	1	8	9	7		
Surcingle:						
Webbing	1	34	50	50		
Loops	2	8	8	8		
Billet	1	2	30	30		
Billet reinforce	1	2	4	4		
Chape	1	2	7	4	1	1
Chape loop	1	4	4	1		
Curb bridle:						
Crown piece	1	1	26	26		
Cheek pieces	2	12	9	9	4	
Cheek billets	2	10	10	10		
Brow band	1	22	15	15		
Throat latch	1	21	17	17	2	
Reins	2	60	60	60	2	
Rein billets	2	13	18	18		
Curb strap	1	20	20	20	2	
Curb-strap safe	1	1	7	7		
Watering bridle, reins	2	60	67	67		
Link:						
Body	1	16	11	11	1	
Billet	1	12	12	12		
Halter:						
Crown	1	1	27	26		
Crown chape	1	8	8	8	1	1
Cheek pieces	2	13	8	8		
Throat band	1	23	18	18		
Nose band	1	14	18	18		
Chin strap	1	40	87	87	1	1
Loops, standing	2	3	1	1		
Loops, sliding	2	4	1	1		
Throat strap	1	17	6	6		
Halter strap	1	87	81	81	1	1
Lariat rope	1	318	300	300		
Horse cover:						
Billets	2	1	14	14		
Chapes	2	4	4	4		
Chape loops	2	3	8	8		
Reinforces	4	4	8	8		
Reinforce linings	4	4	8	8		
Surcingle billet	1	2	18	18		
Surcingle-billet linings	1	2	4	4		
Surcingle chape	1	7	4	4		
Surcingle-chape loop	1	4	4	4		
Surcingle loop	2	2	2	2		
Crupper reinforce	2	3	3	3		
Crupper-reinforce linings	2	3	3	3		
Duck—						
Sides	2	36	77	76		
Surcingle	1	9	70	68		
White webbing—						
Surcingle-all bindings	4	1	5	5		
Surcingle-all reinforce	8	1	2	1		
Crupper—						
Rope	1	1	31	31		
Webbing, drab	1	1	33	33		

Dimensions of leather parts of cavalry-horse equipments—Continued.

Articles.	Num-ber.	Width.	Length.		Buckles.	
			Cut.	Fin-ished.	Num-ber.	Width.
Nosebag:						
Side straps—		Inches.	Inches.	Inches.		Inches.
Head strap.....	1	1½	54	54		
Billet reenforce.....	1	1½	34	34		
Buckle strap.....	1	1½	184	15		
Buckle loop.....	1	1½	34	1½		
Bottom.....	1	124	124	34		
Duck body.....	1	324	15	124		
Horse brush:						
Body pieces.....	2	44	9	9		
Hand strap.....	1	2	7	44		
Currycomb:						
Body pieces.....	2	5	44	44		
Hand strap.....	1	1½	74	5		
Spur straps.....	2	4	214	194	2	1
Spur-strap loops.....	1	1½	44	42		
Waist belt, long.....	1	1½	44	38		
Waist belt, short.....	1	1½	64	1½		
Sliding loop.....	1	1½	44	1½		
Saber attachment:						
Long sling.....	1	1	28	26		
Short sling.....	1	1	14	14		
Sliding loops.....	2	1	34	1		
Pistol holster:						
Body.....	1	94	114	114		
Body reenforce.....	1	1	14	14		
Flap.....	1	34	84	84		
Frog.....	1	34	94	54		
Bottom.....	1	1	1	1		
Saber knot:						
Sling.....	1	1	304	154		
Tassel.....	1	34	15	15		
Tassel loop.....	1	1	24	24		
Tassel braiding strip.....	1	1	45	2		
Slide loops.....	2	1	2	2		
Slide-loop braiding strip.....	2	1	35	3		
Button loop.....	1	1	3	3		
Canteen strap:						
Strap.....	1	1	32	30	1	1
Snaps.....	1	1	34	34		
Sliding loop.....	1	1	3	3		
Standing loop.....	2	1	24	24		
Haversack strap.....	1	2	56	56		
Sliding loop.....	2	1	44	14		
Guidon stirrup:						
Hood.....	1	144	94	94		
Socket.....	1	54	6	6		
Top strap.....	1	1	12	44		
Top-strap reenforce.....	1	1	24	24		
Bottom strap.....	1	1	7	34		

ARM RACK FOR CALIBER .30 RIFLE (METAL PARTS OF).

These parts will be issued for repairs when required and are expendable.

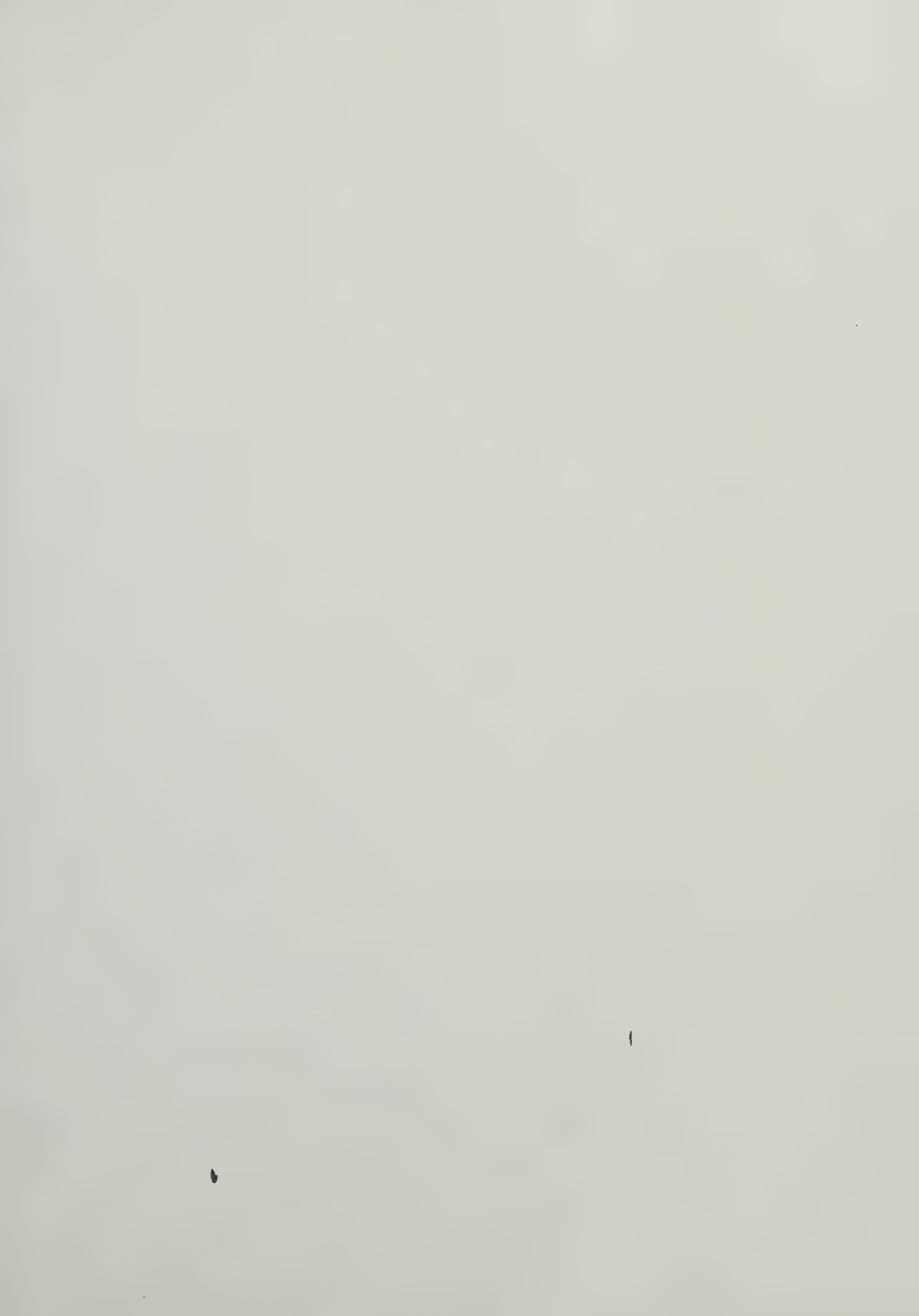
	Price.
1 brass rest for revolver.....	
3 iron rivet pins.....	
1 padlock staple.....	
1 locking band.....	
1 bottom band.....	
1 front clip.....	
2 side clips.....	
2 hinge rivets.....	
3 iron feet.....	
Cost of arm rack complete.....	\$12.75

Arm rack for caliber .30 carbine (metal parts of).

	Price.
1 top band.....	
1 bottom band.....	
2 revolver band hinge rivets.....	
1 carbine locking band.....	
2 carbine band hinge rivets.....	
1 front clip for revolver locking band.....	
2 side clips for revolver locking band.....	
1 front clip for carbine locking band.....	
2 side clips for carbine locking band.....	
2 padlock staples.....	
3 iron feet.....	
1 revolver locking band.....	
Cost of arm rack complete	\$20.00

Arm rack for revolver (metal parts of).

	Price.
4 locking bands	
1 top band.....	
1 bottom band.....	
4 feet.....	
8 side clips.....	
4 front clips.....	
4 padlock staples.....	
8 hinge rivets.....	
Cost of arm rack complete, caliber .38	\$29.16
Arm rack for caliber .45 rifle	\$11.75
Arm rack for caliber .45 carbine.....	
Arm rack for caliber .45 revolver.....	29.68



CHAPTER XVIII.

PACKING AND TRANSPORTATION.

An officer who turns over supplies to another for transportation in the best condition in which it is possible to put them is relieved from any further responsibility therefor by the receipt of the officer to whom they are intrusted for transportation. Should the officer to whom the stores are consigned discover damage or deficiency, he will apply for a board of survey, before which all concerned will be heard in person or by deposition. The board will ascertain and determine the amount and condition of the stores actually delivered to the receiving officer, who will receipt to the officer intrusted with their transportation for the amount and quantity so determined. The latter officer will be held responsible for all damages or deficiency, unless relieved therefrom by the report of the board of survey, duly approved by the reviewing authority. (A. R., 1249.)

Arms, ordnance stores, and quartermaster supplies, issued to the several States and Territories under the laws for arming and equipping the militia, will be turned over to the Quartermaster's Department for transportation and delivery at the railroad depot or steamboat dock nearest to the point within the State or Territory designated by the governor thereof. Separate bills of lading will be used in shipping this property. (A. R., 1254.)

Ordnance stores, ammunition, powder, etc., when shipped beyond the seas should be packed in hermetically sealed cases and boxes and cases strapped with iron, the weight of each box not to exceed 150 pounds, if practicable. If the character of the stores will permit the box should be not more than 22½ inches long, and height and width about 15½ inches.

All small-arms ball cartridges for ocean transportation are packed in zinc-lined wooden boxes, the .30 and .38 caliber ball cartridges in new-pattern folding paper boxes stitched at the ends. Labels of different colors are used on the paper boxes to distinguish the different kinds of cartridges.

Officers who ship arms of any description are held responsible that they are so packed that, under ordinary handling, they can not break loose from their fastenings in the boxes, and that no loaded arm is packed for transportation. When loaded arms or arms insecurely packed are received by an officer he will report the facts direct to the Chief of Ordnance. (A. R., 1729.)

After packing arms or other ordnance stores for shipment the covers and bottoms of the arm chests and packing boxes will, if possible, be sealed with wax and stamped with an official mark by the officer responsible. The lid will be secured by screws, at least two of which will be sealed. Each board on top and bottom will have at least one sealed screw. The screw heads will be countersunk to a depth sufficient to protect the wax seal from injury. The design of the seal will designate the arsenal, depot, post, or organization from which shipment is made. For over-sea ship-

ments all boxes and crates will be properly strapped with wire or hoop iron. (A. R., 1730.) G. O. 64, A. G. O. 1903.

The Ordnance Department will prepare official stamps for sealing boxes and distribute them in duplicate to each company. Company commanders will account for them in their quarterly returns of ordnance stores, and use them exclusively for purposes intended. (A. R., 1731.)

In preparing property for shipment the name of the invoicing officer, or of the arsenal or depot, the date of the invoice, the number, gross weight, and general contents of each box, or package, and the name or designation of the receiving officer will be distinctly marked thereon. Each quartermaster who ships or receives ordnance stores will satisfy himself that the seals on the packages are unbroken. If the seals should be broken and any stores lost he will cause the value of the lost stores to be charged to the carrier. (A. R., 1732.) G. O. 64, A. G. O., 1903.

In packing breech mechanisms for shipment care must be taken to fasten them so they can not move in the boxes, and the packing box should be so arranged that the obturator spindle head (mushroom head) can not rest against the end of the box. This is to protect the gas-check pad.

Packing boxes for breech mechanism for seacoast guns are made large enough to contain below blocks on which the breech blocks rest. This admits of a sling being put around the block to remove it from or lower it into the box. The block and other parts should not be placed on masonry on the ground, but on planks to protect them from being burred or covered with sand.

Special packing boxes have been devised for the 3.2-inch and 3.6-inch field shell and shrapnel, each box to contain 5 rounds, which boxes take the place of the old box containing 10 and 8 rounds, respectively, as fast as the new ones are issued.

When stores are turned over to the Quartermaster's Department for transportation they will be accompanied by triplicate invoices, one of which will be receipted and returned by the shipping quartermaster to the invoicing officer. Duplicate invoices, with duplicate receipts, to be signed by the receiving officer, and a shipping list describing the contents of each box or package will be sent direct to the receiving officer by mail, to reach him, if practicable, before the receipt of the stores. Duplicate invoices, with duplicate receipts, to be signed by the receiving officer, will be sent direct to him by mail. Materials procured for current use at ordnance establishments will be transported at the expense of the Ordnance Department. (A. R., 1733.) G. O. 64, A. G. O., 1903.)

For packing and shipping of ordnance and ordnance stores various sized boxes are used to contain the quantities and of the weights given in the following tables:

Packing Boxes.

Outside dimensions.			Inside dimensions.			Weight, empty.	Contents.	Gross weight.
Length.	Width.	Depth.	Length.	Width.	Depth.			
<i>Inches.</i> 59½	<i>Inches.</i> 22½	<i>Inches.</i> 16½	<i>Inches.</i> 56	<i>Inches.</i> 20½	<i>Inches.</i> 14½	<i>Pounds.</i> 68	110 canteens	<i>Pounds.</i> 143
							70 nosebags	149
							100 exposed nosebags	158
							6 cavalry saddles	145
							120 caliber .58 holsters	130
							20 saddlebags	146
							60 blanket bags	154
							40 carbine scabbards	135
							1 breech cover, 15-inch dy- namite gun	141
							40 artillery knapsacks	153
							170 revolver holsters, P. C., caliber .45	145
							480 revolver cartridge boxes, P. C., caliber .45 ..	146
							1 breech cover, 8-inch dy- namite gun	180
							110 holsters, luger	110
							40 covers, Gatling gun, cal- iber .30	137

Packing boxes—Continued.

Outside dimensions.			Inside dimensions.			Weight, empty.	Contents.	Gross weight.
Length.	Width.	Depth.	Length.	Width.	Depth.			
Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Pounds.		Pounds.
40½	15½	13½	37	14	12	34	250 canteen-haversack straps.....	189
							600 curb straps, cavalry.....	148
							1,500 saber straps.....	149
							100 watering bridles.....	140
							1,100 cavalry coat straps.....	150
							200 cavalry saber belts, 38-inch.....	115
							200 cavalry saber belts, 42-inch.....	121
							130 saber belts and attachments.....	125
							370 saber attachments.....	133
							750 cavalry links.....	161
							160 stirrup straps.....	187
							1,600 spur straps.....	146
							310 pairs blanket bag coat straps.....	126
							300 waist belts.....	188
40½	15½	13½	37	14	12	34	255 pairs blanket-bag shoulder straps.....	180
							150 halter straps.....	150
							700 saber knots.....	120
							320 gun slings.....	143
							1,000 lariat straps.....	148
							600 coat straps, cavalry.....	187
							160 curb-bridle reins.....	143
							10 harness sacks.....	94
							130 cruppers.....	110
47½	16½	15½	44	14½	14	44	70 haversacks.....	143
							440 breech-mechanism covers.....	181
							150 surcingles, Nos. 1 and 2.....	145
							140 surcingles, No. 3.....	158
							110 horse brushes.....	134
							20 streamers with halyards.....	120
							50 halter headstalls.....	142
							400 rionchet flags.....	129
							70 curb bridles, complete.....	160
							60 officers' sword belts.....	122
							70 cinchas, 22 inches.....	150
							60 cinchas, 24 inches.....	136
							60 cinchas, 26 inches.....	138
							60 cinchas, 28 inches.....	140
							80 pairs officers' spurs and straps.....	129
							180 cavalry curb-bridle headstalls.....	146
							40 halters, complete.....	110
							50 gunners' haversacks.....	162
							800 cloth silhouettes, "E".....	185
							200 cloth silhouettes, "D".....	132
							600 cloth silhouettes, "F".....	145
							20 quarter straps.....	186
							10 breech covers, 10-inch disappearing carriage, '95.....	123
47½	16½	15½	44	14½	14	44	10 breech covers, 10-inch disappearing carriage, '95.....	110
							200 waist belts and plates, P. C.....	148
							3 paulins, 12 by 15 feet.....	147
							3 paulins, 12 by 12 feet.....	128
							1 paulin, 20 by 30 feet.....	154
							250 danger flags.....	129
							800 canteen covers.....	131
28½	11½	10½	25½	10½	8½	18	60 pounds harness oil.....	86
			25½	12	10	18	60 side lines, 80 inches.....	140
							60 side lines, 24 inches.....	128
							60 side lines, 18 inches.....	116
44	23½	17½	40½	21½	16	52	1 set artillery wheel harness.....	208
44	23½	16½	40½	21½	14½	50	1 set artillery lead harness.....	184
50½	22	22	47	20½	20½	65	50 stirrups, hooded.....	149
48½	27½	10½	45	26	9	51	100 meat cans.....	149
45½	22½	18½	42	21	17	57	200 tin cups.....	150
20½	12½	10½	17	10½	9	15	100 picket pins.....	165
27½	12½	9½	24	11	8	15	600 N. C. O. waist belt plates and hasps.....	120
							500 waist belt plates and hasps.....	120

Packing boxes—Continued.

Outside dimensions.			Inside dimensions.			Weight, empty.	Contents.	Gross weight.
Length.	Width.	Depth.	Length.	Width.	Depth.			
<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Pounds.</i>		<i>Pounds.</i>
41½	16½	15½	38	15	13½	37	60 lariats.....	143
40½	14½	13½	37½	13	12	30	130 curb bits.....	148
29½	20½	18½	26	19	11½	30	200 currycombs.....	150
29½	16½	10½	26	14½	9	24	400 spurs.....	149
a 148	9½	8½	144	7½	6½	40	Floating target frame.....	149
a 67	36	10½	53	34	8½	90	Anchor rope and canvas for above.....	267
a 148	11	8½	144	9	8½	50	1 towing target frame.....	163
a 57	36	12	53	34	10	99	Anchor, rope, and canvas for above.....	261
a 37	22½	22½	33	20½	20½	19½	Crate for 1 barrel.....	92
a 252	10½	7½	248	8½	5½	10	Target frame for land target.....	97
a 40	13½	10½	36	11½	8½	20	Canvas and rope for above.....	66
120	13	10	116	11	8	45	1 complete Texas target.....	146
114	17	11	110	15	9	50	Sliding targets: Supporting frame.....	315
84	36	12½	80	36	10½	55	Carriages.....	160
112	7	6	108	5	4	18	Sliding rods.....	173
112	16	10	108	14	8	40	6 frames.....	224
a 172	14	12	168	12	10	81	Sliding targets 6 by 12 feet: Supporting frame.....	347
a 148½	38	11½	139½	36	9½	90	Carriages.....	244
a 112	7	6	108	5	4	18	Sliding rods.....	173
a 150	16½	12½	146	14½	10½	70	6 frames.....	424
Track for rolling target, not crated, weight per section								
a 158	53	9	154	49	7		Carriage for rolling target.....	119
a 150	15	13	146	13	11	59	Laidley targets: 6 frames.....	344
a 88½	16½	11½	84	14½	9½	40	6 frames, 6 by 6 feet.....	208
a 154	16½	11½	150	14½	9½	64	6 frames, 6 by 12 feet, horizontal.....	320
a 160½	14½	12½	156	12½	10½	65	6 frames, 6 by 12 feet, vertical.....	345
90½	13½	8	86½	11½	6	56	1 target, 6 by 6 feet, in box.....	120
160	11½	8	156	9½	6	81	1 target, 6 by 12 feet, in box, horizontal.....	156
100	15½	8	96	13½	6	65	1 target 6 by 12 feet, vertical, in box.....	150
a 28½	14½	19½	24½	12½	17½	81	Int. packing for 3" .2 am- munition chest.....	123
a 17½	12½	12½	15½	10½	10½	10	1 dummy cartridge for 12- inch mortar.....	50
a 20½	14½	14½	18½	12½	12½	12	1 section cartridge for 12- inch rifle.....	60
40½	27½	20				80	1,000 canteen straps.....	424
32	16½	11				25	50 cartridge belts, caliber .30	86
30	16	16				48	500 frogs, N. C. O. swords.....	110
40½	18	15				56	1,000 canteen straps, cav- alry.....	312
64	20½	7				75	500 carbine slings.....	278
40½	27½	80				80	40 horse covers.....	340
30	18	9				37	1 Hotchkiss mountain gun, caliber 1" .65.....	75
39	18	12				45	1 cavalry forge.....	115
49	43½	26½				83	1 Hotchkiss mountain gun pack outfit.....	470
43	24	12				57	50 canvas watering buckets.....	136
7½	4½	6½					1 marking outfit.....	6½

a Crate.

Outside dimensions.			Inside dimensions.			Weight empty.	Contents.	Gross weight.
Length.	Width.	Depth.	Length.	Width.	Depth.			
<i>Inches.</i>	<i>Ins.</i>	<i>Ins.</i>	<i>Ins.</i>	<i>Ins.</i>	<i>Ins.</i>	<i>Pounds.</i>		<i>Pounds.</i>
78	28	24	74	26	22	31	5 H steel frame silhouettes.....	160
48½	28	27½	44	26	25½	40	10 D steel frame silhouettes.....	219
41	29	17½	37	27	16½	44	20 E steel frame silhouettes.....	220
108	63	42	104	61	40	47	3 M steel frame silhouettes.....	239
55½	25½	26½	51½	23½	24½	63	Carbine armrack.....	142
55½	24	22½	51½	22	20½	56	Revolver armrack.....	175
56½	25½	23½	51½	23½	21½	63	Magazine rifle armrack.....	109
56½	24½	22½	51½	22½	20½	56	Springfield rifle armrack ..	106

Packing boxes—Continued.

Articles.	Weight.		Issued as called for.	Weight of articles.
	Pounds.	Ounces.		Pounds.
Centers for paper targets:				
A, not rolled	4	4	Weight of 50	4
B, in rolls of 50	9	2	do	9
C, in rolls of 50	25		do	25
Cloth silhouettes:				
H	10	2	Weight of 25	10
D	7	5	do	7
E	8	15	do	4
M	10	15	Weight of 10	11
Paper silhouettes:				
H	2	8	Weight of 25	2
D	2		do	2
E		14	do	1
M	7	8	Weight of 50	7
Paper targets, model 1897:				
A, in rolls of 50	23		do	23
B, in rolls of 50	36		do	36
C, d, in rolls of 25	33		Weight of 25	33
C, e, in rolls of 25	36		do	36
A, d, in rolls of 50	25		Weight of 50	25
Paper targets, old pattern, elliptical:				
A, in rolls of 50	24		do	24
B, in rolls of 50	34		do	34
C, in rolls of 25	36		Weight of 25	36
Skirmish targets:				
H	30		Crated	30
D	21		do	21
E	8		do	6
M	71		do	71

Articles.	Number in box.	Outside dimensions.	Inside dimensions.	Gross weight.	Remarks.
Rifles, Springfield:					
Caliber .45	20	54½ by 18 by 15½ inches...	54½ by 16 by 13½ inches...	280	Arm chest.
Caliber .45, rod bayonet.	20	58½ by 18 by 16½ inches...	54½ by 16 by 13½ inches...	272	Do.
Caliber .45, cadet.	20	58½ by 18 by 15½ inches...	54½ by 16 by 13½ inches...	272	Do.
Carbines:					
Springfield, caliber .45.	20	47½ by 22 by 14 inches...	43½ by 20 by 12 inches...	240	Do.
Magazine, caliber .30.	10	48 by 16½ by 14½ inches...	43 by 14½ by 12½ inches...	145	Do.
Rifles magazine, caliber .30.	20	48 by 27 by 14½ inches...	44 by 25 by 12½ inches...	260	Do.
Rifles magazine, caliber .30.	10	54½ by 14½ by 14½ inches...	50½ by 12½ by 12½ inches...	168	Do.
Rifles magazine, caliber .30.	20	56 by 23½ by 14½ inches...	52 by 21½ by 12½ inches...	290	Do.
Company arm chests:					
Rifle, caliber .30.	10	54½ by 14½ by 14½ inches...	50½ by 12½ by 12½ inches...	168	Do.
Carbine, caliber .30.	20	56 by 23½ by 14½ inches...	52 by 21½ by 12½ inches...	290	Do.
Carbine, caliber .30.	10	48 by 16½ by 14½ inches...	43 by 14½ by 12½ inches...	145	Do.
Carbine, caliber .30.	20	48 by 27 by 14½ inches...	44 by 25 by 12½ inches...	250	Do.
Revolvers, Colt's:					
Caliber .38	50	54½ by 14 by 11 inches...	50½ by 12 by 9 inches...	150	Do.
Caliber .45, 54-inch barrel.	50	55½ by 15½ by 11 inches...	51½ by 13½ by 9 inches...	157	Do.
Sabers:					
Light cavalry	50	50 by 16 by 24 inches...	48 by 14 by 22 inches...	260	
Cavalry officers'	30	50 by 20 by 14 inches...	48 by 18 by 12 inches...	187	
Light artillery	10	51 by 18 by 11 inches...	49 by 11 by 9 inches...	72	
Artillery officers'	50	53½ by 18 by 15½ inches...	54½ by 16 by 13½ inches...	272	
Swords, officers'	10	42 by 12½ by 12½ inches...	40 by 10½ by 10½ inches...	65	
Swords, officers'	10	44 by 14½ by 9½ inches...	42 by 12½ by 7½ inches...	60	
Gatling guns:					
Caliber .45	1	57½ by 14 by 13 inches...	55½ by 12 by 11 inches...	320	
Caliber .30	1	57½ by 14 by 13 inches...	55½ by 12 by 11 inches...	380	
Gardner gun, caliber .45.	1	51½ by 11 by 13 inches...	49½ by 9 by 13 inches...	200	
Colt's automatic gun:					
Caliber .30	1	69 by 10½ by 21½ inches...	65 by 8½ by 19½ inches...	217	
Caliber .30, carriage.	1	55 by 47½ by 19 inches...	53 by 45½ by 17 inches...	298	
Bayonet scabbards, caliber .30.	200	25 by 20 by 15 inches...	23 by 18 by 13 inches...	143	
Bayonet scabbards, caliber .30.	500	52 by 24 by 14 inches...	50 by 22 by 12 inches...	340	
Fencing muskets, caliber .58.	8	61½ by 14½ by 8½ inches...	57½ by 12½ by 6½ inches...	108	
Fencing muskets, caliber .58.	30	58½ by 18 by 15½ inches...	54½ by 16 by 13½ inches...	225	
Rear sights, complete; front sights and pins—caliber .30, model 1901.	500	19 by 14 by 10 inches...	17 by 12 by 8 inches...	140	

Packing boxes—Continued.

Articles.	Con- tents.	Weight.	Measurements.	Cubic inches.
		<i>Pounds.</i>		
Ball cartridges, caliber .30.....	1,000	81	18½ by 14 by 7½ inches.....	1,876.47
Ball cartridges, caliber .30, gallery practice.....	1,000	46	16 by 12½ by 7½ inches.....	1,525
Blank cartridges, caliber .30.....	1,000	46	12½ by 12½ by 7½ inches.....	1,889.06
Dummy cartridges, caliber .30.....	1,000	74	19½ by 12½ by 7½ inches.....	1,926.84
Rifle ball cartridges, caliber .45.....	1,000	124	18½ by 14 by 8½ inches.....	2,151.19
Carbine ball cartridges, caliber .45.....	1,000	106	16½ by 13½ by 8½ inches.....	1,900.08
Rifle and carbine blank cartridges, caliber .45.....	1,000	44	16½ by 11½ by 7½ inches.....	1,375.60
Revolver ball cartridges, caliber .45.....	1,200	70	15½ by 9½ by 7½ inches.....	1,059.79
Revolver blank cartridges, caliber .45.....	12,000	119	17 by 12½ by 7½ inches.....	1,620.31
Revolver blank cartridges, caliber .45.....	1,200	30	14½ by 9½ by 7½ inches.....	908.97
Revolver blank cartridges, caliber .38.....	2,000	75	18½ by 10½ by 7½ inches.....	1,482.11
Rifle bullets, caliber .45.....	2,000	29	14½ by 9½ by 7½ inches.....	1,057.6
Carbine bullets, caliber .45.....	2,000	156	16½ by 11½ by 7½ inches.....	1,357
Revolver bullets, caliber .45.....	2,000	128	16½ by 11½ by 6½ inches.....	1,242
Round balls, caliber .45.....	2,000	76	14½ by 11½ by 5½ inches.....	890.53
Round balls, caliber .30.....	2,000	47	14 by 10½ by 4½ inches.....	643.75
Primers, small-arms cartridges, black powder.....	2,000	15	12½ by 8½ by 2½ inches.....	281.7
Small-arms powder, black..... pounds.....	30,000	60	20½ by 10½ by 9½ inches.....	2,080.36
Friction primers, cannon, axial vents.....	100	140	21½ by 17½ by 13½ inches.....	6,384.375
Friction primers, cannon, radial vents.....	1,875	98	18½ by 16½ by 11 inches.....	4,032
Friction primers, cannon, axial vents.....	5,000	106	18½ by 16½ by 15 inches.....	4,320
Gallery practice shells, caliber .30.....	1,000	38	15½ by 12½ by 7½ inches.....	1,454.44
Reloading and cleaning tools, caliber .30 shells.....	1 set.	26	34 by 10½ by 9½ inches.....	2,610.5
Shotgun, 12, 13½ pounds, complete rounds.....	5	96	20½ by 12½ by 11 inches.....	2,460
Shotgun, 20, 20 pounds, complete rounds.....	5	126	22½ by 10½ by 11 inches.....	3,238.53
Shotgun, 28, 45 pounds, complete rounds.....	2	130	19½ by 14½ by 11 inches.....	3,522.41
Shotgun, 30, 35 pounds, complete rounds.....	2	190	31 by 14½ by 13 inches.....	6,643.85
Shotgun, 32, 105 pounds, complete rounds.....	1	130	28½ by 9½ by 9½ inches.....	2,402.47
Shotgun, 32, 125 pounds, complete rounds.....	1	152	33½ by 25½ by 9½ inches.....	2,883.4
Shotgun, 32, 134 pounds, complete rounds.....	5	86	21½ by 16½ by 9½ inches.....	2,170.24
Electric primers, obturator.....	100	15	9½ by 9½ by 4 inches.....	
Friction primers, obturator.....	200	30	16½ by 9½ by 4 inches.....	
	100	15	9½ by 9½ by 5 inches.....	
	200	31	16½ by 9½ by 5 inches.....	

Articles.	Package.		
Name.	Unit.	Measure.	Weight.
			<i>Pounds.</i>
Blocks:			
Wood.....	1	12 by 6 by 44 inches.....	75
Wood, whole.....	1	12 by 4 by 44 inches.....	48
Wood, half.....	1	8 by 8 by 20 inches.....	25
Wood, quarter.....	1	8 by 4 by 20 inches.....	21
Wood, quarter.....	1	8 by 2 by 20 inches.....	9
Capstan, complete.....	1	7 by 4 by 34 feet.....	420
		Box, 18 by 18 by 4 inches.....	78
		Crate, 86 by 10 by 6 inches.....	102
		Box, 4 feet by 6 by 6 inches.....	150
Gln:			
Garrison, complete.....	1	Box, 8 feet 2 inches by 12 by 10 inches.....	490
		Box, 4 feet 1 inch by 22½ by 15½ inches.....	342
		Crate, 21 feet 8 inches by 8½ by 8½ feet.....	1,455
Piper, complete.....	1	Crate, 14 feet 2½ inches by 2 feet 2 inches by 8 feet.....	507
		Box, 64 feet by 12 by 64 inches.....	185
		Box, 2 feet 8 inches by 15 by 64 inches.....	213
Handcart (assembled) a.....	1	4 by 6 by 7 feet.....	158
Plank, way.....	1	3 by 12 inches by 15 feet.....	75
Roller.....	1	3 feet by 8 inches.....	28
		Roll, 34 feet diameter by 28 inches.....	240
Rope.....	1'	Roll, 4 feet diameter by 36 inches.....	525
	1'	Roll, 44 feet diameter by 36 inches.....	940
	1	12 by 15 by 204 inches.....	967
Skids.....	1	8 by 8 by 72 inches.....	107
Sling chains.....	1	20 by 8 by 6 inches.....	110
Sling cart, large (assembled) b.....	1	8 by 9 by 21 feet.....	2,370
Timbers.....	1	10 by 10 inches by 35 feet.....	1,300

a Body, 4 by 7 feet; wheels, 5 feet by 6 inches, unassembled.

b Body, 9 by 21 feet; wheels, 8 feet by 19 inches, unassembled.

Packing boxes—Continued.

Articles.	Number in box.	Exterior dimensions.	Cubic contents.		Weight of box packed.	Weight minus the weight of the packing box.
<i>Class 1.</i>			<i>Feet.</i>	<i>Inches.</i>	<i>Pounds.</i>	<i>Pounds.</i>
3".2 B. L. rifle.....	1	99 by 19 by 15 inches	16	3	1,065	{M. 1890, 794 M. 1897, 830
3".6 B. L. rifle.....	1	102 by 20 by 15 inches	17	8	1,442	1,200
3".6 B. L. mortar.....	1	82 by 19 by 18 inches	4	7	342	245
5-inch B. L. siege rifle.....	1	154 by 26 by 20 inches	46	4	3,846	3,756
7-inch B. L. siege howitzer.	1	112 by 30½ by 22 inches	43	6	4,158	4,068
8-inch B. L. rifle	1 carload.	288 by 49 by 36 inches	294	0	32,150	31,485
Breech mechanism	2 boxes...	(One 24 by 19 by 18 inches. One 29 by 16 by 16 inches.	4 4	9 3½		
10-inch B. L. rifle	1 carload.	372 by 58 by 41 inches	511	11		
Breech mechanism	2 boxes...	(One 53 by 20 by 20 inches. One 20 by 25 by 21 inches.	7 6	7½ 1½	64,928	64,108
12-inch B. L. rifle	2 carloads.	444 by 68 by 48 inches	838	8		
Breech mechanism	2 boxes...	(One 37 by 23½ by 23½ inches. One 24 by 29 by 23 inches.	11 9	9½ 7	116,852	115,527
12-inch B. L. mortar, steel.	1 carload.	146 by 56 by 40 inches	196	0		
Breech mechanism	2 boxes...	(One 35 by 31½ by 19½ inches. One 18 by 25 by 19 inches.	12 4	3½ 11½	29,800	29,110
<i>Class 2.</i>						
Carriage and limber, gatling.		110 by 74 by 55 inches	259	1	1,364	Not boxed.
Carriage and limber, 3-inch or 6-pounder.		117 by 79 by 57 inches	304	10½	1,760	Not boxed.
Caisson and limber		126 by 79 by 57 inches	328	4½	2,248	Not boxed.
Limber for 3".2 gun.....		64 by 58 by 58 inches	124	7	957	Not boxed.
Caisson and limber, 3".2 gun.		172 by 64 by 58 inches	369	6	2,216	Not boxed.
Combined forge and battery wagon, 3".2 gun.		171 by 64 by 67 inches	424	4	2,061	Not boxed.
3".6 field-mortar carriage.	1 box	41 by 20 by 20 inches	9	6	358	266

Description.	Outside dimensions.	Contents.	Weight of contents.
	<i>Inches.</i>		<i>Pounds.</i>
1.65 Hotchkiss.....	{ 4 wood zinc-lined boxes or 4 circular zinc boxes.	18 shell each = 72 shell. 22 shell each = 88 shell.	252.64 273.6
3-inch R. F. gun, Driggs-Seabury..	114 by 114 by 32½	4 rounds.....	100
3".2 134-pound shell	74 by 114 by 23½	5 rounds.....	.....
3".2 134-pound shrapnel.....	94 by 114 by 22½	5 rounds.....	.....
3".2 14-ounce canister.....	94 by 114 by 28½	5 rounds.....	.....
3".6 20-pound shrapnel, rifle.....	10 by 114 by 21½	4 rounds.....	86
3".6 20-pound shrapnel, mortar.....	10 by 114 by 16½	4 rounds.....	82
5-inch 45-pound common shell.....	124 by 14½ by 20	2 rounds.....	100
5-inch 45-pound cast-iron shell	124 by 14½ by 21½	2 rounds.....	100
5-inch 45-pound shrapnel.....	124 by 14½ by 19½	2 rounds.....	100
5-inch 45-pound common shell.....	74 by 12½ by 17½	2 shells.....	90
5-inch 45-pound cast-iron shell.....	74 by 12½ by 19½	2 shells.....	90
5-inch 55-pound solid shot.....	74 by 12½ by 14½	2 shots.....	110
5-inch 55-pound cast-iron shell.....	74 by 12½ by 22	2 shells.....	110
5-inch 55-pound A. P. shot.....	74 by 12½ by 14½	2-inch shot.....	110
5-inch 55-pound A. P. shell.....	74 by 12½ by 19½	2 shell.....	110
7-inch 105-pound common shell.....	94 by 9½ by 34½	1 round.....	112
7-inch 105-pound cast-iron shell.....	94 by 9½ by 36½	1 round.....	112
7-inch 105-pound shrapnel.....	94 by 9½ by 30½	1 round.....	112
7-inch 125-pound cast-iron shell, mortar	94 by 9½ by 32	1 round.....	130
7-inch 125-pound shrapnel, mortar	94 by 9½ by 36½	1 round.....	130
7-inch 105-pound cast-iron shell.....	94 by 9½ by 25½	1 shell.....	105
7-inch 105-pound common shell.....	94 by 9½ by 22½	1 shell.....	105
7-inch 125-pound cast-iron shell.....	94 by 9½ by 29½	1 shell.....	125
7-inch 125-pound common shell.....	94 by 9½ by 25½	1 shell.....	125
6-inch 100-pound cast-iron shot.....	84 by 8½ by 21½	1 shot.....	100
6-inch 100-pound cast-iron shell.....	84 by 8½ by 25½	1 shell.....	100
6-inch 100-pound A. P. shot.....	84 by 8½ by 20½	1 shot.....	100

There are issued to the service for storage of the reserve ammunition hermetically sealed galvanized-iron cartridge storage cases. These cans for shipment are crated with heavy wooden crate, held together by screws. The interior dimensions of these cases for the various calibers of guns (each to hold one charge or section of charge) are as follows:

Gun.	Length of can.	Diameter of can.
	<i>Inches.</i>	<i>Inches.</i>
6-inch R. F. gun	28	5.5
6-inch R. F. gun	33.5	7
8-inch B. L. rifle (2 sections)	26	9.5
10-inch B. L. rifle (2 sections)	33.25	11.8
12-inch B. L. rifle (3 or 4 sections)	26.6	14.2
12-inch B. L. mortar	21	12.6

From time to time issues of ordnance and ordnance supplies in quantities less than those given in the tables on pages 646 to 652, and also less than original packages, are issued, and for this purpose the use of different sizes of boxes and packages become necessary, the dimensions depending upon the particular issue of material that is being made. It is therefore impossible to give the exact tabulated sizes of such packages, but for general purposes and covering the equipment of large bodies of troops in their regimental or company organizations these tables will suffice to give a general idea of the size of packages and their weight to be transported.

REVEILLE GUNS.

Modern breech-loading guns of the old models, 3.2-inch B. L. rifle and 3.6-inch B. L. rifle, will be issued for reveille guns, when available, to take the place of the light 12-pounders and 3-inch muzzle-loading rifles as morning and evening guns.

The equipment for light 12-pounder gun is as follows:

	Price.
1 sponge and rammer	\$1.65
1 sponge cover .....	.73
1 worm and staff	2.57
1 handspike trail	1.10
1 vent cover .....	.16
1 vent punch .....	.50
2 thumb stalls .....	.32
1 priming wire .....	.10
2 lanyards .....	.81
1 gunner's gimlet .....	.24
1 primer pouch	1.33
1 cartridge pouch	1.10
1 sponge bucket, iron	3.24
1 tampion .....	.39
1 paulin, 12 by 12 feet	8.40

The equipment of 3-inch muzzle-loading rifle is as follows:

	Price.
1 bucket, sponge, iron	\$3.54
1 gunner's haversack	3.50
1 gunner's gimlet .....	.24
1 handspike trail	1.10
2 lanyards .....	.81
1 priming wire .....	.10
1 sponge cover .....	.21
1 sponge and rammer	1.25

	Price
2 thumb stalls	\$0.3
1 tube pouch	1.3
1 vent cover .....	.1
1 worm and staff	2.3
1 tampion .....	.4

Requisitions for sponges and rammers, sponge covers, and tampions should state the kind of gun for which required. Extra rammer heads, woolen sponges, and sponge heads are issued as needed from time to time.

In making requisition for vent pieces for light 12-pounder guns the name of the manufacturer of the gun must be given, otherwise the requisition can not be filled until this information is supplied. The maker's name will be found inscribed on the face of the muzzle of the gun.

If difficulty is experienced in removing the old vent piece, the proper tools can be obtained from the commanding officer, Rock Island Arsenal, upon application, the tools to be returned when they have served their purpose.

The tools required for the extraction and replacing of vent pieces are as follows:

- 1 wrench and tap.
- 1 cold chisel.
- 1 knife file.
- 1 smoothing file.

CHAPTER XIX.

GENERAL PROVISIONS OF REGULATIONS AND GENERAL ORDERS PERTAINING TO ORDNANCE PROPERTY, AND MISCELLANEOUS PROVISIONS RELATIVE TO ISSUE OF ORDNANCE MATERIAL, ETC.

The general denomination "Ordnance and ordnance stores" comprehends the cannon and artillery carriages and equipments, all apparatus and machines for the service and maneuver of artillery; all small arms, personal equipments, and horse equipments; all ammunition and tools, machinery, and materials for the ordnance service; all horse equipments for the artillery; blacksmiths' tools for the cavalry; blacksmiths', saddlers', and wheelwrights' (carpenters') tools for artillery; and, in general, all property of whatever nature supplied to the military establishments by the Ordnance Department. (A. R., 1695; O. R., 13, 1877.)

The commanding officer of a company is responsible for the care and preservation of its equipments and for the proper performance of duties connected with the rendering of property returns of the company. (A. R., 281.)

It is forbidden to use any dressing or polishing material on the leather accouterments or equipments of the soldier, the horse equipments for cavalry, or the artillery harness, except the preparations supplied by the Ordnance Department for that purpose. (A. R., 307.)

Articles of public property issued to a company for its exclusive use will, when practicable, be marked with the letter or number of the company and number and arm of the regiment. Such articles issued to an enlisted man (arms and clothing excepted) will, as far as practicable, be marked with the number of the man, letter or number of the company, and number of the regiment. Haversacks and blanket bags will be uniformly marked on the outside, as follows: Cavalry, crossed sabers; infantry, crossed rifles with letter of company above and number of regiment below the intersection; artillery, crossed cannons with the number of the company or battery at the intersection of the cannons; the special corps of the Army according to their respective devices. The design will be stenciled in black, the device 5 inches long, and letters and numbers in full-faced characters 1 inch high. The design will be placed above the letters "U. S." on equipments, and the number of the soldier, in characters 1 inch high, will be placed at the bottom near the lower edge of the blanket bag. The canteen will be marked in the manner prescribed for haversacks, except that the marking will be placed on the face not occupied by the "U. S." (A. R., 309.)

In the field the mess furniture of the soldier will be limited to one tin cup, knife, fork, and spoon, and such device for individual cooking as may be furnished by the Ordnance Department. (A. R., 316.)

The method described in the instruction pamphlet issued to the company commander for the mounting, issuing, and care of the various guns and carriages will be strictly followed. (A. R., 371.)

When modern guns are to be mounted at a post by the artillery and no artillery officer familiar with and competent to perform the work is available, the artillery commander will request the services of an ordnance officer for that purpose. (A. R., 378.)

When gun carriages and guns are to be assembled or mounted in seacoast fortifications they shall be subject to the inspection of an officer of the Ordnance Department, both during process of erection and after its completion. Such officer of the Ordnance Department shall, under instructions from the Chief of Ordnance, take all measures necessary, including, if deemed desirable, the firing of the piece, to give assurance of the perfect serviceability of the armament before it shall be turned over for use. (A. R., 379.)

When engineer or artillery officers are about to commence the work of erection of guns and carriages, they will notify the Chief of Ordnance, who will, if in his opinion it is necessary, designate an officer to place himself in communication with the engineer or artillery officer with a view to being present at the proper time and with proper assistance and appliances for the performance of the duty hereby devolved upon him. (A. R., 380.)

Installed armament shall be subject at any time to the inspection of ordnance officers, to be designated by the Chief of Ordnance. Department commanders will instruct commanding officers to furnish such assistance as may be necessary to carry out inspections prescribed and to perform necessary work on the armament. (A. R., 381.)

The Ordnance Department will supply motors to be attached to gun carriages, the necessary power lathes, machinists' tools, and tools and implements for the use of battery mechanics, and will make such repairs to guns and carriages as can not be made at the post. (A. R., 383.)

The Ordnance Department will furnish angle-measuring instruments, replottting boards, difference disks, range scales, drawing instruments, material, etc., to seacoast defenses. (A. R., 392.)

Penthouses and other shelters of similar character for seacoast artillery will not be provided, and the deterioration of artillery material must be prevented by the unremitting care and watchfulness of the officers and troops to whom the use and care of the modern armaments are confided. (A. R., 399.)

At all posts with fixed batteries a book will be kept, known as the "Post Book of Artillery Record," in which, under the direction of the post commander, will be entered the number of each mounted gun, its caliber, weight, name of founder and inspector, and other marks, the description of its carriages, whence received, date of receipt at post, and the greatest field of fire of the gun in position. This book will be furnished by the Ordnance Department; instructions for keeping it will be found in the front pages. (A. R., 408.)

Targets and target material for artillery practice will be provided by the Ordnance Department. The Quartermaster's Department will furnish all necessary assistance in placing, removing, and storing targets. (A. R., 414.)

The necessary books and blanks for reports as to the amount of instruction imparted and the efficiency attained in small-arms practice will be supplied by the Ordnance Department. (A. R., 417.)

All members of the Hospital Corps will be equipped with canteen complete, haversack complete, waist belt and plate, one-half shelter tent complete, and the privates also with Hospital Corps pouch and litter sling. This equipment will be issued to the man, charged to him on the descriptive book, and when station is changed will be noted on the descriptive list, dropped from the property returns by the responsible medical officer, and taken up by the medical officer to whom the man reports. The officer dropping the property will notify the department to which it belongs of the name of the officer who is to take up the same, or the name of the

post to which the man is transferred, or if neither of these be known he will report the names of all men transferred. The officer to whom the stores are transferred will, upon taking them up, notify the department to which they belong of the name of the officer by whom the stores were dropped, or the post from which they were transferred, or if neither of these be known he will report the names of the men transferred. (A. R., 1604; General Order No. 8, A. G. O., 1803.)

Hospital patients will, if possible, leave their arms and equipments with their companies. (A. R., 1631.)

Horse equipments for mounted men of the Hospital Corps will be furnished by the Ordnance Department. (A. R., 1617.)

All officers and other persons in the military establishment to whom ordnance and ordnance supplies or funds are intrusted will make accounts and returns thereof to the Chief of Ordnance at the times and in the manner prescribed by him. (A. R., 1694.)

In time of peace, ordnance and ordnance stores are issued from the arsenals and armories by direction of the Chief of Ordnance. (A. R., 1696.)

In time of war, issues may be made to troops in service on the order of any general or field officer commanding an army, garrison, or detachment. To authorize an issue to militia, they must have been regularly mustered into the service of the United States and the requisition for the stores must be properly approved. (A. R., 1697.)

The Chief of Ordnance will, on the recommendation of a department commander, approved by the Commanding General of the Army and the Secretary of War, establish ordnance depots at such points as may be designated by the Secretary of War where ordnance stores will be held for distribution to the troops, under such regulations as the department commander may prescribe. (A. R., 1698.)

When practicable, these depots will be under the charge of ordnance officers, and only such limited supply of ordnance stores as may be required to meet emergencies will be kept at or issued from them. All other ordnance stores will be supplied from the arsenals, as provided in paragraph 1696. (A. R., 1699.)

An officer who makes an issue of ordnance stores to one not in command of troops, except under orders from competent authority, will be charged with the money value of the stores so issued. (A. R., 1708.)

Serviceable surplus ordnance stores may be turned in at the nearest arsenal on the order of a department commander, or, if in the hands of a recruiting officer, on the order of the Adjutant-General of the Army. (A. R., 1717.)

Officers in charge of arsenals and ordnance depots will afford every facility to officers authorized to turn in property. They will give receipts for it according to condition. (A. R., 1718.)

On arrival of recruits at their destination, the clothing bags, haversacks, meat cans, tin cups, knives, forks, spoons, and canteens in their possession will be immediately turned over to an officer to be designated by the commanding officer of the post to which the recruits are sent for assignment, who will receipt to the responsible officer for the property in the hands of such recruits and cause the same to be properly packed and turned over to the Quartermaster's Department for transportation to such arsenal as may be designated by the Chief of Ordnance, for repairs and subsequent issue to recruiting stations and recruiting rendezvous.

Should any of these stores be needed for the proper equipment of the organization to which the recruits are sent, the officer designated to receipt for such property will, with the approval of the post commander, transfer them and immediately report to the Chief of Ordnance what articles are so transferred.

In all cases where no officer accompanies the recruits the officer responsible for the property in their hands will forward invoices for the stores to the commanding offi-

cer of the post to which the recruits are sent for assignment. In case of any loss or discrepancy the responsibility will be at once investigated. (A. R., 1720.)

No officer will turn in any unserviceable ordnance stores except as provided in Army Regulations. (A. R., 1723.)

List of prices to be charged against soldiers for the loss or damage to firearms are published from time to time. (A. R., 1724.)

Records of artillery firing will be kept by commanding officers of permanent forts and batteries, and a copy forwarded direct to the Chief of Ordnance at the end of February, April, June, August, October, and December of each year. (A. R., 1735.)

In the care and preservation of artillery material, magazines, small arms, etc., the instructions contained in the authorized Manual of Heavy Artillery and the publications of the Ordnance Department will be observed. (A. R., 1737.)

No written or pictorial description of tests by this Government of arms or munitions of war will be made for publication without the authority of the Secretary of War, nor will any information, written or verbal, concerning them, which is not contained in the printed reports and documents of the War Department, be given to any unauthorized person. (A. R., 1738.)

All officers or other persons in the military establishment, to whom ordnance and ordnance supplies or funds are intrusted, will make accounts and returns thereof to the Chief of Ordnance at the times and in the manner prescribed by him in Ordnance Property Regulations. (A. R., 1694 and 1734.)

All members of the Signal Corps will be equipped with canteen complete, haversack complete, waist belt and plate, and one-half shelter tent complete. This equipment will be issued to the man, charged to him on the descriptive book, and when station is changed will be noted on the descriptive list, dropped from the property returns by the responsible signal officer, and taken up by the signal officer to whom the man reports. The officer dropping the property will notify the department to which it belongs of the name of the officer who is to take up the same, or the name of the post to which the man is transferred, or if neither of these be known he will report the names of all men transferred. The officer to whom the stores are transferred will upon taking them up notify the department to which they belong of the name of the officer by whom the stores were dropped, or the post from which they were transferred, or if neither of these be known he will report the names of the men transferred. (A. R., 1750; General Order No. 8, A. G. O., 1903.)

ISSUES AND SALES.

Ordnance and ordnance stores include cannon and artillery carriages and equipments, apparatus and machines for the service and maneuver of artillery, small-arms ammunition and equipments, horse equipments and harness for the artillery, tools, machinery, and materials for the ordnance service, and all property of whatever nature supplied to the military establishment by the Ordnance Department. (A. R., 1695.)

Requisitions for ordnance stores, to replace those condemned, will be accompanied by a certified copy of the inspection report, but issues may be made before condemnation on requisition and the officer's statement that the stores are immediately needed for the proper equipment of his command and that the articles are to replace unserviceable stores, but if required to replace those lost or damaged by the carelessness of the men, the officer will certify that he has charged the cost of the same on the muster and pay rolls. (A. R., 1703.)

The service arms, ammunition, accoutrements, and horse equipments required by an officer for his own use in the public service may be sold to him by the Ordnance Department at the regulation price and the money received passed to the credit of the proper appropriation. Ordnance supplies thus sold to officers will not be disposed of to persons not in the military service. Necessary repairs to the service

arms and equipments of an officer will be made by the Ordnance Department at the cost of these repairs. Officers making purchases, or having repairs done, will furnish certificates of the fact that these sales or repairs are for their own use in the public service. (A. R., 1704; G. O. 64, A. G. O., 1903.)

When the arms or equipments authorized to be purchased in the preceding paragraph can not be obtained from an ordnance officer, officers may take from those for which they are accountable such articles as they require for their personal use, or may furnish them to officers of their commands for like purpose. In such cases they will refund the cost of the articles to the Ordnance Department by depositing the money with an assistant treasurer or an authorized depository, and taking and transmitting the customary certificates. (A. R., 1705.)

Ordnance stores will not be loaned to any person, and any officer violating this rule will be held responsible for the money value of the articles. (A. R., 1707.)

Issues and transfers of ordnance stores will not be made on memorandum invoices and receipts except in special cases authorized by and subject to instructions from the Chief of Ordnance. (A. R., 1708; G. O. 64, A. G. O., 1903.)

Arm chests not required for the storage of supplies will be returned to the nearest arsenal or ordnance depot when the cost of transportation is not greater than the value of the property. Officers to whom such chests have been issued will be charged with their value if they are destroyed. Empty barrels, boxes, crates, and other packages in which property or stores have been received at ordnance posts and arsenals, and which are no longer useful for the purpose for which they were originally intended, may be disposed of upon the certificate of the responsible officer setting forth the facts and recommending a disposition of the property; these certificates will be submitted, in lieu of inspection reports, to the authority competent to order the final disposition of the property borne thereon. (A. R., 1725; G. O. 64, A. G. O., 1903.)

When sales of ordnance stores are recommended all of the copies of the inspection report will be forwarded by the department commander direct to the Chief of Ordnance for the final action of the Secretary of War, except in the Division of the Philippines, where the reports will be forwarded for the action of the division commander, which is final. (A. R., 1727; G. O. 28, A. G. O., 1903.)

When the recommendation of an inspector for sale of ordnance supplies is approved, two copies of the report will be returned to the officer accountable for the stores, through the headquarters of the department in which he may be serving, with detailed instructions how to make the sales and account for the proceeds, and one copy transmitted to the Inspector-General. One copy of each inventory and inspection report must accompany the return. (A. R., 1728.)

The standard blank forms used in Army administration, with the notes and directions thereon, have the force and effect of Army regulations. New forms or alterations will not be made without the authority of the Secretary of War, and the date on which a form or alteration was authorized will be printed on the form itself. All notes or directions on these blanks will, prior to their issue, be approved by the Secretary of War. These forms and lists of them will be furnished by the chiefs of the various bureaus and offices of the War Department. Requisitions therefor will call for them by number and name. (A. R., 1761.)

When a soldier deserts a board of survey will be called by the post or regiment commander to ascertain whether he has lost or abstracted any articles of Government property; and if so, to determine the money value of the same. The value of the articles thus found to be missing will be charged against the deserter on the next muster rolls of his company, which will be accompanied by a copy of the board's report. A copy of so much of the proceedings as relate to the property charged on any roll will accompany the return to which the property pertains. (A. R., 127.)

REQUISITIONS.

Requisitions for ordnance supplies to meet emergencies will be filed from a depot, under the instructions of the department commander. The officer in charge will be responsible, under the department commander, that sufficient stores, procured by timely requisitions upon the Chief of Ordnance, are always on hand. Unserviceable and unsuitable ordnance and ordnance stores at such depots are under the control of the Chief of Ordnance. (A. R., 1700.)

Requisitions for ordnance and ordnance stores not on hand within a department must be approved by the immediate commanders. The personal approval of the department commander or of the ordnance officer of his department is necessary, but in the absence of the department commander the approval may be made in his name by one of his staff officers. After approval one copy is forwarded to the Chief of Ordnance direct. (A. R., 1701; G. O. 8, A. G. O., 1903.)

Requisitions will be made in conformity with the supply tables prepared by the Chief of Ordnance, unless extraordinary circumstances, to be plainly set forth in each case, should require a larger supply of one of the articles authorized. (A. R., 1702.)

Requisitions for blanks and blank books required for the use of the Ordnance Department will be made quarterly, or when needed, by every regiment and company. Those suited to every command and arm of the service can be obtained upon application to the Chief of Ordnance. (A. R., 1736.)

PUBLIC PROPERTY—ACCOUNTABILITY AND RESPONSIBILITY.

"Every officer of the Ordnance Department, every ordnance storekeeper, every post ordnance sergeant, each keeper of magazines, arsenals, and armories, every assistant and deputy of such, and all other officers, agents, and persons who shall have received or may be intrusted with any stores or supplies shall quarterly, or oftener if so directed, and in such manner and on such forms as may be directed or prescribed by the Chief of Ordnance, make true and correct returns to the Chief of Ordnance of all ordnance, arms, ordnance stores, and all other supplies and property of every kind received by or intrusted to them and each of them or which may in any manner come into their and each of their possession and charge." (Sec. 1167, Revised Statutes of the United States.)

"That returns of ordnance property now required to be made quarterly to the Chief of Ordnance shall hereafter be made semiannually."

In accordance with the provisions of the above act, all ordnance-property returns which were formerly required to be made quarterly to the Chief of Ordnance will hereafter be made semiannually. In the future semiannual property returns will be rendered for the half years ending June 30 and December 31 of each year. (Cir. 10, A. G. O., 1903; act of Congress approved February 25, 1903.)

The auditing and settlement of ordnance-property accounts, which was formerly performed by the Second Auditor of the Treasury, has, by the act of Congress approved March 29, 1894, been devolved upon the Chief of Ordnance; and officers responsible for ordnance property are required to satisfy the Chief of Ordnance of the sufficiency of all papers submitted as vouchers for the disposition made of the stores for which they are responsible.

The property returns, when examined, found correct, and finally settled and closed, are filed in the Ordnance Office, and are no longer sent to or acted on by any of the accounting officers of the Treasury.

Accountability and responsibility devolve upon any person to whom public property is intrusted and who is required to make returns therefor. Responsibility without accountability devolves upon one to whom such property is intrusted, but who is not required to make returns therefor. Thus, with respect to quartermaster sup-

plies intrusted to a company or detachment commander, responsibility but not accountability attaches. (A. R., 739.)

The officer in permanent or temporary command of a post or station is responsible for the security of all public property of the command, whether in use or in store, and, although for purposes of periodical accountability to the War Department it may have been officially receipted for by subordinate officers, the commanding officer is nevertheless responsible and pecuniarily liable with them for the strict observance of the regulations in regard to its preservation, use, and issue. He will take care that all storehouses are properly guarded, that only reliable agents are employed, and only trustworthy enlisted men are detailed for duty in them or in connection with property. (A. R., 740.)

If an officer in charge of public property of a command (not properly pertaining to a company or detachment) is, by order, leave of absence, or any other cause separated from it, the commanding officer, or an officer designated by him, will receipt and account for it. (A. R. 741.)

If it becomes necessary to remove all officers from the charge of public property, the commanding officer will take measures to secure it and report the circumstances to the proper authority. (A. R., 742.)

A company or detachment commander is responsible for all public property pertaining to his company or detachment, and will not transfer his accountability therefor to a successor during periods of absence of less than a month unless so ordered by competent authority. When such absence exceeds a month, the question of responsibility is settled by the proper authority. (A. R., 743.)

The officer in temporary or permanent command of a company or detachment is responsible for all public property used by or in possession of the command, whether he receipts for it or not. (A. R., 744.)

The property responsibility of a company commander can not be transferred to enlisted men. It is his duty to attend personally to its security and to superintend issues himself or cause them to be superintended by a commissioned officer. (A. R., 745.)

An officer will not, when it can be avoided, be detailed for duty which will separate him from public property for which he is accountable. (A. R., 746.)

A transfer of public property involves a change of possession and accountability. In ordinary cases of transfer, except in the Medical Department, the transferring officer will furnish the receiving officer with invoices in duplicates, accurately enumerating the property, and the latter will return duplicate receipts. In cases in which complete transfers of property occurs, instead of exchanging separate invoices and receipts, as above provided, the receiving officer may make direct entry on the final return (both original and duplicate) of his predecessor that all the property thereon enumerated as on hand and transferred to successor was received by him. The transferring officer may make similar entry on the return of his successor, stating that all the stores there taken up as received from such predecessor were actually turned over by him. (A. R. 747; G. O. 8, A. G. O., 1903.)

When an officer to whom stores have been forwarded believes them to have miscarried, he will promptly inform the issuing and forwarding officers. (A. R., 748.)

If an officer to whom public property has been transferred refuses to receipt for it, the invoicing officer will report the facts to the commanding officer of the former for action. Copies of all papers relating to the transaction will be filed with his returns. (A. R., 749.)

Upon the receipt of public property by an officer he will make careful examination to ascertain its quality and condition, but will not break the original packages until the issues are to be made, unless he has reason to believe the contents defective. Should he discover defect or shortage, he will apply for a board of survey to determine it and fix the responsibility. Should he consider the property unfit for use,

he will submit inventories in triplicate and request the action of an inspector. The same rule will be observed in regard to packages when first opened for issue and for property damaged or missing while in store. (A. R., 750.)

When packages of supplies are opened for the first time, whether because of apparent defect or for issue, the officer responsible, or some other commissioned officer, will be present and verify the contents by actual weight, count, or measurement, as circumstances may require, and in case of deficiency or damage will make written report of the facts to the post commander. If only the officer responsible be present and make the report, he will secure the sworn statements in writing of one or more civilians or enlisted men regarding the condition of the property when examined. Should a board of survey be convened, the post commander will refer to it the report made by the examining officer, together with the sworn statements. At arsenals and depots where there are persons whose special duty it is to receive and issue public stores, the reports herein required may be made by them instead of officers of the Army. (A. R., 751.)

The giving or taking of receipts in blank for public property is prohibited. (A. R., 752.)

Supplies procured by one bureau will not be furnished to another except by special authority of the Secretary of War, except in the Division of the Philippines where the authority of the division commander is sufficient. When furnished and restored in kind they will be delivered at the post from which received, or at such other post as department commanders or chiefs of bureaus concerned may determine. If the transaction is between two bureaus of the War Department payment will be made at the contract or invoice price of the stores. When between a bureau of the War Department and any other Executive Department the amount to be paid will include the contract or invoice price and cost of transportation. (A. R., 753; G. O. 28, A. G. O., 1903.)

When it is impracticable for an officer to personally superintend his issues—as may be the case with one charged with disbursements or the care of depots—he should choose with great caution the agent to whom he intrusts the duty. (A. R., 755.)

The keys of storerooms or chests will not be intrusted to enlisted men or civilians without great vigilance on the part of the accountable officer and a resort to every reasonable precaution, including frequent personal inspections, to prevent loss or damage. (A. R., 756.)

An officer in charge of public property in use or in store will endeavor by timely repairs to keep it in serviceable condition. For this purpose the necessary means will be allowed on requisition, and property in store so repaired will be issued. (A. R., 757.)

All movable public property will, if practicable, be conspicuously branded "U. S." before being used. (A. R., 758.)

Public property will not be used nor will labor hired for the Government be employed for any private purpose whatsoever, except as authorized in the regulations. (A. R., 759.)

For property worn out in the public service the preliminary action of a board of survey is not necessary, and the accountable officer will submit inventories thereof and ask for an inspector's action. When the action of a board of survey and an inspector are necessary, the inventory will be accompanied by a copy of the proceedings of the board. Empty barrels, boxes, crates, and other packages, together with metal turnings, scrap metals, ground bone, and other waste products of manufacture which accumulate at arsenals, depots, and military posts, which are unsuitable for the public service, will be disposed of in the manner prescribed for property condemned and ordered sold in paragraph 761. At arsenals and depots where such accumulations have considerable money value proposals will be invited for specific lots and quantities, or for the accumulations of definite periods, as the head of the

department to which the property pertains may deem best suited to the public interest. (A. R., 760; G. O. 8, A. G. O., 1903.)

Returns for property are not to be made in manuscript unless it is impossible to procure the proper forms in time.

Memorandum receipts are not allowed in case of ordnance property for submission to paymasters in lieu of certificates of nonindebtedness. (G. O. 175, A. G. O., 1898.)

Officers in the service, in replying to communications from the office of the Chief of Ordnance, should always refer to the number of the ordnance-office letter as well as its date to which the reply applies. This number will always be found on the face of the letter immediately above the address, or, if an indorsement, in the upper left-hand corner.

PROPERTY DAMAGED, LOST, DESTROYED, ETC.

Causes of damage to and of loss and destruction of military property are classified as follows:

1. Unavoidable causes, being those over which the responsible officers have no control, occurring (a) in the ordinary course of service or (b) as incident to an active campaign.

2. Avoidable causes, being those due to carelessness, willfulness, or neglect. (A. R., 763.)

Officers responsible for property will be charged for any damage to or loss or destruction of the same, and the money value deducted from their monthly pay, unless they show to the satisfaction of the Secretary of War by their own affidavits or certificates, or by one or more depositions, that the damage, loss, or destruction was occasioned by unavoidable causes and without fault or neglect on their part. (A. R., 764.)

The proper officers to administer oaths in the administration of the affairs of the Army (except when otherwise specially provided) are judge-advocates of departments, judge-advocates of courts-martial, the trial officers of summary courts, and in the case of boards of survey the recorders thereof, or, if there be no recorder, the president thereof. When none of these are within reach and available, recourse must be had to a notary public or other civil officer competent to administer oaths for general purposes. (A. R., 765.)

If an article of public property be lost or damaged by the neglect or fault of any officer or soldier, he shall pay the value thereof or the cost of repairs at such rates as a board of survey may determine. (A. R., 766.)

The amount charged against an enlisted man on the pay rolls on account of loss or damage of or repairs to Government property shall not exceed the value of the article or cost of repairs, and such charge will only be made on conclusive proof, and never without an inquiry if the soldier demand it. He will be informed at the time of signing the pay rolls that his signature will be regarded as an acknowledgment of the justice of the charge. (A. R., 767.)

If articles of public property are embezzled or lost or damaged through neglect by a civilian employee, the value or damage as ascertained (and by a board of survey if necessary) shall be charged to him and set against any pay or money due him. (A. R., 767.)

PROPERTY ACCOUNTABILITY.

All public property, whether paid for or not, must be accounted for on the proper returns. (A. R., 774.)

An officer accountable for the public property of two or more companies will account for that pertaining to each, except quartermaster's supplies, on a separate return. (A. R., 775.)

Accountability for public property will not be transferred to enlisted men, except to sergeants of the post, noncommissioned staff at ungarrisoned posts, and sergeants of the Signal Corps or enlisted men acting as such. (A. R., 776.)

Vouchers for issues or expenditures of property not authorized by regulations will be accompanied by copies of the orders directing the issues or expenditures. (A. R., 777.)

An officer will have credit for an expenditure of property made in obedience to the order of his commanding officer. If the expenditure is disallowed it will be charged to the officer who ordered it. (A. R., 778.)

Public property expended, lost, or destroyed in the military service must be accounted for by affidavit, or the certificate of a commissioned officer, or other satisfactory evidence. (A. R., 779.)

When an enlisted man has, by a court-martial, been convicted of losing or damaging public property, the officer responsible for the property will send with his property return a certified copy of so much of the court-martial order as refers to the case, giving number, date, and place of issue of the order, and stating on the face of said copy the rolls on which the charges are made. (A. R., 780.)

Should an officer or agent of the Government charged with public property fail to render the prescribed returns thereof within a reasonable time, a settlement of his accounts will be made by the proper bureau of the War Department and the money value of the property with which he is charged will be reported against him for stoppage. (A. R., 781.)

All returns of stores or supplies will be rendered as required by regulations or orders. Those of subsistence stores and subsistence property will be forwarded within ten days after the expiration of the accounting periods, and those of other classes of stores and property within twenty days, to the chiefs of bureaus to which they pertain. Abstracts will be forwarded with the money accounts. (A. R., 782.)

ADMINISTRATIVE EXAMINATION OF PROPERTY RETURNS.

As soon as possible after the receipt of a return by the proper chief of bureau, it will be examined in his office, and the officer making the return will be notified of all errors and irregularities found therein and granted three months to correct them. Suspensions or disallowances will not be made on account of slight informalities which do not affect the validity of a voucher, but the officer's attention may be called to them. Whenever the errors have been corrected or compensation has been made for deficient articles, and the action of the bureau chief is sustained or modified by the Secretary of War, the return will be regarded as settled, and the officer who rendered it will be notified accordingly. (A. R., 783.)

If the necessary corrections in the return be not made within the prescribed time the facts will be reported to the Secretary of War. When it has been determined that the money value of the property for which an officer has failed to account shall be refunded to the United States, the facts will be certified to the Auditor for the War Department by the proper chief of bureau. (A. R., 784.)

BOARDS OF SURVEY.

Public property which has been damaged, except by fair wear and tear, or is unsuitable for the service, before being submitted to an inspector for condemnation, will be examined by a board of survey. (A. R., 790.)

A board of survey must fully investigate matters submitted to it. It will call for all evidence attainable, and will not limit its inquiries to proofs or statements presented by parties in interest. It will rigidly scrutinize the evidence, especially in

cases of alleged theft or embezzlement, and will not recommend the relief of officers or soldiers from responsibility unless fully satisfied that those charged with the care of property have performed their whole duty in regard to it. In no case, however, will the report of a board take the place of the evidence required in paragraph 764, A. R. (A. R., 793.)

The party responsible for the property to be surveyed will, in all cases, furnish the original certificates or affidavits or the testimony of the witnesses upon which he relies to relieve him from responsibility, and the number of duly attested copies of such affidavits or certificates thereof required by a board of survey to accompany its proceedings. (A. R., 794.)

A board of survey can not condemn public property. Its action is purely advisory. It is called for the purpose of ascertaining and reporting facts, submitting opinions, and making recommendations upon questions of responsibility which may arise through accident, mistake, or neglect. (A. R., 797.)

The proceedings of a board of survey will be prepared in triplicate and signed by each member who concurs in the finding. Should a member not concur he will submit a minority report, to be embodied in the record immediately after the majority report, and signed by the dissenting member. The proceedings will then be submitted to the convening authority for approval or disapproval. (A. R., 798.)

When the value of the property submitted for survey or the loss or damage to be inquired into does not exceed \$500, and the interested officer does not request the department commander's action, the proceedings of the board will be considered complete for submission as a property voucher upon the approval of the convening authority. One copy will then be forwarded to department headquarters and the others delivered to the officer accountable. (A. R., 799.)

Should the proceedings be disapproved by the convening authority, or should the value of the property submitted for survey or the loss or damage to be inquired into exceed \$500, or, whatever the amount involved, should the officer pecuniarily interested request it, the proceedings in triplicate will be forwarded to the next higher commander authorized by paragraph 791, A. R., to convene boards of survey for review, and with this action are complete. One copy will then be filed at department headquarters and the others sent to the accountable officer. But all proceedings of boards of survey, whatever their nature or the amounts involved, are subject on call to the approval or disapproval of the next higher commander authorized to convene such boards, or such other action on his part as the merits of the case or the interests of the Government may in his opinion require. (A. R., 800.)

The proceedings of a board of survey which recommends the relief of officers and enlisted men from responsibility should not be approved unless full and careful investigation and convincing proof to sustain the board's findings appear. (A. R., 801.)

Properly approved proceedings of boards of survey may be submitted as vouchers to property returns. They are not to be considered as conclusive until accepted by the Secretary of War. Until then they are to be regarded simply as the opinions and recommendations of disinterested officers, to aid in the settlement of questions of accountability between the Government and the individuals concerned. If, on examination in the proper bureau, they exhibit serious errors or defects either of investigation or of finding, they will not be accepted as sufficient vouchers, and the officer submitting them will be duly notified, that he may have opportunity to make explanations or appeal to the Secretary of War. (A. R., 802.)

At posts or stations not under the control of department commanders commanding officers will be governed by these regulations in convening boards of survey and acting upon their proceedings, but in cases referred to in paragraph 800, A. R., will forward the papers to the chiefs of bureaus to which the property pertains. (A. R., 803.)

Separate proceedings of boards of survey will be had for each staff department concerned. (A. R., 804.)

Whenever a board recommends a stoppage against an enlisted man and the recommendation is approved the convening authority will cause a copy of the proceedings to be furnished to the company commander, who will charge the amount on the next pay rolls of the company. (A. R., 805.)

If an inspection of property follows the action of a board of survey thereon, one copy of the proceedings will accompany the inventory and inspection report which is transmitted for approval, and will afterwards be returned to be used as a voucher to the officer's returns, and another, with the inventory and inspection report, will be filed by the officer with his retained papers. (A. R., 806.)

PROPERTY FOR CONDEMNATION.

As far as practicable, inventories of unserviceable property will state the cost of the articles, and in case of damage or inferior stores the depot whence obtained, the marks upon them, with marks on original packages, and names of contractors and inspectors. The certificate as to the condition of the property on the inventory and inspection report will be signed by the officers "accountable" therefor, and not by the officer "responsible."

Inspectors will exercise great care in examining property submitted to them for condemnation, and in making recommendations regarding its disposition. Articles "to be continued in service" are such as are still serviceable. Those "to be dropped" from the returns are such as can not be sold at the post and are not worth the cost of transportation to an arsenal or depot for repair. If worthless they must be so far destroyed so as to prevent any possibility of future presentation. Such articles as can not be destroyed will, when practicable, be marked "I. C." (inspected—condemned), or will be broken up and the serviceable parts retained. * * * Should the inspector's recommendation be disapproved in regard to articles marked "I. C." the marks will be canceled and a certificate of the fact given to the responsible officer. Suitable brands and stencils will be kept for use of inspectors at posts and depots. Articles "to be sold at post" are such as are of no further public use or not worth cost of transportation to a depot. Those "to be turned into depot" are such as can not be repaired at the post and are worth cost of transportation. Small arms found to be unfit for service will be turned in to the nearest arsenal or depot to be broken up, or disposed of in accordance with the instructions of the Secretary of War. Small arms found to be unfit for service in the Division of the Philippines will, however, be turned into the Manila Ordnance Depot to be broken up or disposed of in pursuance of the orders of the division commander. (A. R., 984; G. O. 28, A. G. O., 1903.)

Public property in use will not be reported as unserviceable nor condemned by an inspector merely because worn or shabby in appearance when really strong and serviceable. (A. R., 985.)

Great care will be taken to prevent property once condemned and ordered dropped from the returns from being again presented for inspection. When public property is presented to an inspector for condemnation the officer responsible will certify on the inventory that the property has not been previously condemned. (A. R., 986.)

Inspectors will, when practicable, cause the destruction, in their presence, of all property found to be worthless and which is without money value at or near the place of inspection, except small arms, and will state in their reports that "the articles recommended to be destroyed have no money value at or near the post." The action of an inspector on property of this character will be final, and his report will be a valid voucher for the responsible officer. Inspectors will be held responsible for their action in this particular. When property thus condemned is not

destroyed in the presence of the inspector the responsible officer will certify to the fact of subsequent destruction in his presence. (A. R., 987.)

Department commanders, the commander of an army corps or army in the field, or the Commanding General of the Army, may give orders, on the reports of authorized inspectors, to sell, destroy, or make such other disposition of condemned property as the case may require, except the sale of ordnance and ordnance stores and the destruction of saddles issued by the Ordnance Department, for which the orders of the Secretary of War must be given. If the property be of considerable value, and there be good reason to suppose that it can be more advantageously applied or disposed of elsewhere than within the command, the matter will be referred to the War Department, through the Adjutant-General of the Army. But in the Division of the Philippines the orders of the division commander are sufficient for the destruction of condemned saddles and other ordnance and ordnance stores. (A. R., 989; G. O. 28, A. G. O., 1903.)

Orders for the final disposition of condemned property will be indorsed by the proper authority on the inspection reports, each copy being made complete in itself. One will be forwarded, through military channels, to the Inspector-General of the Army, and the others to the accountable officer, who will forward one, or suitable extracts therefrom, with his accounts, and file the other with his retained papers. (A. R., 990.)

When an officer has been overpaid, or is indebted to the United States for money or property, or has failed properly to account for the same, the chief of the bureau concerned will promptly notify him of the amount of his indebtedness or his failure to account. If after notice he does not refund, or make satisfactory explanation, or take proper action within a reasonable time, the matter will be reported to the Secretary of War. (A. R., 1497.)

On the order of the Secretary of War stoppages may be made against the pay of officers for overpayments, illegal disbursements, or loss through fraud, or neglect of the public funds, and for deficiencies in, loss of, or damage to military supplies, unless proof be furnished that the deficiency, loss, or damage was not occasioned by any fault on their part. (A. R., 1498.)

PROVISIONS RELATIVE TO INSTRUCTIONS FOR USE, REPAIR, CARE, ETC., OF ORDNANCE PROPERTY.

All bench and hand tools and appliances for working metal (except special tools, fixtures, and spare parts for oil engines, steam engines, and electrical machinery, which are habitually supplied by the makers with such machinery) on hand at seacoast fortifications and borne on Engineer Department property returns will be transferred to the Ordnance Department, and in future such tools will be issued only by that department. (G. O. 58, A. G. O., June 20, 1902.)

The effect of throttling oil in the hydraulic cylinders of seacoast gun carriages must not be changed by loosening or tightening the throttling-bar bolts passing through the walls of the cylinder. This practice is very dangerous, and officers in charge of seacoast carriages are required to see that all bolts passing into hydraulic cylinders are kept tight at all times. (Cir. 21, June 28, 1901.)

The recoil cylinder oil now furnished by the Ordnance Department contracts in volume when frozen, so that bursting of the pipes or cylinders of gun carriages is not likely to happen due to freezing of the oil alone. If water is accidentally mixed with the oil, either from condensation or other causes, it will, when placed in recoil cylinders, accumulate in the lowest part of the piping, and if not occasionally removed may, when frozen, burst the pipes. To avoid this during cold weather the liquid should occasionally be removed from the emptying plugs of gun carriages, the same volume of oil then being placed in the recoil cylinders to keep them filled.

To keep the oil as free from water as possible care should be exercised that receptacles used in the storage of oil are not left open to the weather.

When necessary to fire a gun in extremely cold weather the first round should be with a reduced or warming charge, to decrease the viscosity of the oil resulting from the temperature, thus avoiding high cylinder pressures that might have resulted had a full charge been used. (Cir. 11, Mar. 22, 1902.)

In order to prevent delays, expense, and unnecessary correspondence, any damage to or defects in the ordnance work or material at any artillery post will, as soon as observed, be communicated in writing direct to the district engineer officer and district ordnance officer. (G. O. 137, Oct. 22, 1901.)

Officers accountable for submarine mining property transferred to the Ordnance Department under the provisions of G. O. 31, A. G. O., 1903, will be governed by the following:

Whenever any searchlights, position finders, dial telegraphs, or other instruments for use in fire control and direction are received at a post an officer skilled in their use will be detailed to test them and report as to their condition. The same action will be taken upon these reports as is prescribed in paragraph above.

Whenever submarine mining equipments are turned over by the Engineer Department to the artillery an officer skilled in the use of the same will, if possible, be detailed to inspect the property. In case no such officer is available the officer receiving the property will be governed by the following directions:

A. Inspect all transformers, switch boards, operating boxes, storage batteries, electric-light equipment, circuit closers, regulator plugs, cut-out fuses, and other electrical instruments, to see that they are free from rust and in good working order, and whenever possible test the various apparatus to determine if the circuits are complete and insulation good.

B. All engines and other mechanical appliances must be inspected to see if they are complete and in a good state of preservation.

C. All mine cases, compound plugs, tools, anchors, junction boxes, shackles, closed sockets, rope, and other stores must be examined and their condition noted.

D. Cables and insulated wire must be stored under water if practicable. All material of this character turned over as "serviceable" should be tested for insulation before receipting for the same. (G. O. 65, May 11, 1901.)

Whenever any guns, carriages, breechblocks, or any parts thereof, or any implements pertaining thereto, are received at a post the ordnance officer will make a careful and detailed inspection, reporting to the commanding officer their condition. This report will be forwarded to department headquarters through the artillery district commander. (G. O. 65, A. G. O., 1901.)

Whenever any implement or part of the armament is shipped from the post for repairs, for transfer, or for any other purpose a careful inspection and a full report as to its condition will be made by the responsible officer to the post commander, and a copy of such report will be sent to the officer to whom the article is shipped. (G. O. 65, A. G. O., 1901.)

The breechblocks of 10 and 12 inch breech-loading rifles, model 1888, mounted on the nondisappearing barbette carriage, should not be swung open when the gun has an elevation of more than 1 degree, since with a greater elevation the crank of the translating roller is liable to become bent by striking against the right cheek of the top carriage. Neither of these rifles, on account of this interference, should be elevated or depressed while the breech is open. (Cir. 43, A. G. O., 1902.)

The duties of the "breech detail" prescribed on page 82, Drill Regulations for Coast Artillery, U. S. Army, are modified as follows: During firing, when necessary, the gun should be washed out and the mechanism cleaned with oil. After firing, the gun should be washed out and the mechanism cleaned with oil and the bore and mechanism lubricated with petrolatum or other standard lubricant. At no time

should the mechanism be washed off with water, as it rusts the surfaces about the gas-check pad, split rings, etc. This regulation will apply also to the 12-inch mortars and all rapid-fire guns. (Cir. 30, A. G. O., 1902.)

In mounting the 12-inch mortar carriage, model 1898, the top, bottom, and back of crosshead, the buffer plates, and that part of the saddle behind guides will be painted before assembling; these parts are not accessible after being mounted. In assembling guides or any machined surfaces, put on a thin coat of cosmic; slush all bolts and threads. No cosmic will be applied to the rollers and paths; simple oiling is all that is required. (Cir. 43, A. G. O., 1902.)

Position of Mortars.—The mortar will be habitually elevated so that it will be parallel to the piston rod with the breech cover left off. The translating roller will be left in place. At posts where the sand blows into the breech mechanism and at all posts during the cold season where snow and ice may collect and form around the mechanism the mortar will be kept horizontal with the breech cover on. (Cir. 30, A. G. O., 1903.)

In the care and preservation of rapid-fire guns, the instructions contained in circular of April 1, 1902, issued by Chief of Ordnance, should be carefully followed.

INSTRUCTIONS FOR REGULATING GAS-CHECK PADS.

Experience has shown that as a rule gas-check pads are too tight. It has been customary, because of the simplicity of the method, to adjust the pad with the breech open by tightening the spindle nut until the pad could just be turned by hand. In cold weather when the pad is relatively rigid this adjustment is satisfactory; in warm weather, however, the pad, being more plastic, is forced outward readily till it extends beyond the surface of the split rings. When this occurs, even though the pad can be turned by hand, the pad is not in proper adjustment, since when forced into its seat it will be pressed over the rear ring and injured. As the object of the pad is to form a perfect gas-check at the rear of the tube, the best adjustment is made with the pad seated.

TO ADJUST PAD.

Close the breech, having the spindle nut loose, but not so loose as to permit slipping of the pad or split rings; rotate the block until one-half of the rotation has been accomplished. With the mechanism in position, screw up the spindle nut as tight as it can be screwed with the wrenches provided.

With the new spindle nut having a locking device, it is necessary to insert the end of a screw-driver in the opening of the nut in order to spread it sufficiently to allow its rotation without rotating the spindle.

Lock the spindle nut and rotate the breechblock until the breech is completely closed. This last operation presses the pad in its seat, due to the forward motion of the block.

The pad is now in proper position for firing. (Cir. 46, A. G. O., 1902.)

EXPENDABLE MATERIAL.

All components or appendages of ordnance stores issued to the Army for the replacement of like parts worn out in service or lost, and all leather or sponge material issued to the Army to make like components for repairs, also paints, oils, lumber, nails, and screws used for repairs and preservation of ordnance stores, and all lighting and cleaning material for use and preservation of ordnance stores are expendable and can be dropped from the property returns when actually used for the above-described purposes. (Cir. 48, A. G. O., 1902.)

INSTRUCTIONS FOR ADJUSTING SAFETY ATTACHMENTS OF 4.7 AND 6 INCH R. F. ARMSTRONG FIRING MECHANISM.

With this attachment it is intended to have the firing pin come in contact with the primer when the operating handle is nearly closed; that is, when the stud of the locking crank is about to enter its groove on the handle.

To adjust in accordance with the above idea, with the spanner wrench provided for the mechanism, loosen the locking nut on the operating plunger.

By screwing the inner end of the operating plunger in or out, adjust the length of the plunger so that the point of the firing pin comes flush with the face of the block when the operating handle is in the position mentioned above. Having adjusted the length of the plunger, tighten the locking nut.

As the plunger will from time to time be dismounted for cleaning and may be assembled with an incorrect length, it is desirable to test this adjustment from time to time. (Cir. 59, A. G. O., 1902.)

SEACOAST TARGET PRACTICE REPORTS, ETC.

The following blank forms for reports of artillery practice will be furnished by the Chief of Ordnance for use at all stations where artillery practice may be had:

Form 31. Record of artillery practice.

Form 31a. Form for the chief of artillery (card record).

Form 31b. Record of hits.

Form 31c. Observer's record for lateral deviation.

Form 31d. Record taken by range party.

Form 31e. Station record at D. P. F. or H. P. F. station.

Form 31f. Meteorological record.

Form 31g. Timekeeper's record.

All the forms except 31 and 31a will be put in the form of pads.

Before forwarding the record of artillery practice, the post commander will see that all necessary data from it are entered in the "Post Book of Artillery Record" (furnished by the Ordnance Department). (G. O. 97, A. G. O., 1902.)

No firings will be made with the mortar carriages to attain the twelfth zone, including ranges from 10,900 to 12,500 yards, requiring a muzzle velocity of 1,325 foot-seconds with an 800-pound projectile. A muzzle velocity greater than 1,200 foot-seconds, which will be sufficient to attain a maximum range of 11,500 yards, will not be used. (G. O. 101, A. G. O., 1902.)

INSTRUCTIONS FOR REMOVING OLD PAINT FROM GUNS AND CARRIAGES.

When the paint becomes so thick as to scale off in places or give an unsightly appearance, as will happen after a number of coats have been applied to guns and carriages, it will be removed for repainting, as follows:

Dissolve one pound of concentrated lye, powdered form, in 6 pints of hot water, and slake in enough lime to give the solution the consistency of paint. Use the solution freshly mixed and apply to the parts where paint is to be removed with a brush preferably, or with waste tied on the end of a stick. When the solution begins to dry on the surface use a scraper to remove the old paint and complete the cleaning of the surface with a mop and water. If one application is not sufficient to loosen the paint, apply a second coat. Before applying the new coat of paint wash the surface with liquid made by dissolving one-half pound of washing soda in 8 quarts of water, and wipe dry. Let stand a sufficient length of time to have all parts thoroughly dry before painting. (Cir. 56, A. G. O., Dec. 2, 1902.)

INSTRUCTIONS FOR PACKING STUFFING BOXES FOR HYDRAULIC CYLINDERS.

The following instructions will be observed in packing the stuffing boxes of hydraulic cylinders of seacoast carriages:

These stuffing boxes are to be packed preferably with Garlock's hydraulic water-proof packing, but if hemp packing has been issued it should be used before a supply of the new packing is requested. Garlock's packing is furnished in rings or spiral shapes, while the hemp packing is generally furnished in long braids.

The latter packing should be well soaked in oil or tallow before being put in the stuffing boxes. It is not essential to soak the Garlock packing.

In packing a box, unscrew the follower (see drawing) and be careful to remove the ring gland. For this purpose special extractors, consisting of iron rods threaded at one end, are furnished with each carriage, in which this gland is made in one piece.

In some carriages the gland is made in halves in such a manner that it is withdrawn and inserted with the follower.

All of the old packing in a box should be removed and examined before any additional packing is added, and if any of the old packing can be used again it should be put in after the new packing.

To repack, put on the piston rod one ring or one turn of packing (the braided hemp packing need not be cut to form rings) and force it well to the bottom of the stuffing box by a wooden stick and mallet. Treat each layer of packing in a similar manner until the proper thickness of packing has been attained.

Now push the loose gland against the packing and screw up the follower. No more force should be used on the spanner wrench than that of two men, and generally that of one man is sufficient. The addition of a pipe to the end of a spanner wrench should not be permitted. In screwing up the follower it should be carefully noted that the gland does not bind in the screw threads and that it is properly entered in the smooth part of the box, beyond which no part of the packing should extend when the follower is screwed up.

On the barbette carriages when the box is properly filled and the follower tightened, there should not be a space of more than $1\frac{1}{2}$ inches between the flange of the follower and the piece into which the follower is screwed. On the disappearing carriages this space should not be more than an inch.

It has been generally observed that there is a tendency to put more packing in a box than is necessary, and if the above instructions are followed it is believed the results will be more satisfactory. It is expected that a very slight amount of oil will drip from the stuffing boxes when the carriages are not used, because of the oil soaking through the packing. By placing suitable receptacles this oil can be caught to prevent its rendering the carriages and platforms unsightly.

The followers should be tightened from time to time, at which operations a slightly greater increase in the leakage will be observed for a short time, due to the squeezing out of the oil already in the packing. (Cir. Ordnance Office, Aug. 14, 1899.)

INSTRUCTIONS FOR REGULATING OIL IN CYLINDERS OF SEA-COAST CARRIAGES FOR REDUCED CHARGES.

For the 1,300 foot-seconds velocity with service projectiles in the 8, 10, and 12 inch B. L. rifles the following directions with reference to amount of counterweight and quantity of oil in recoil cylinders will be observed:

On account of the size and consequent low velocities of these practice charges it will be necessary to remove oil from the recoil cylinders of the disappearing carriages in order that the guns shall recoil to a suitable loading position. This removal necessitates a reduction in the amount of counterweight to be used. The proper amount for each carriage should be determined tentatively; it being understood to bring the gun to the firing position without shock. The necessary changes to be made have

been determined practically, and with very slight modifications should answer for all carriages in the service. These are as follows:

8-inch disappearing carriage, L. F., model of 1894:

Amount of oil to be used in each cylinder, $3\frac{1}{2}$ gallons.

Reduction in the amount of counterweight from that required for service conditions, 800 pounds.

8-inch disappearing carriage, L. F., model of 1896:

Amount of oil to be used in each cylinder, $3\frac{1}{2}$ gallons.

Reduction in the amount of counterweight from that required for service conditions, 800 pounds.

10-inch disappearing carriage, L. F., model of 1894:

Amount of oil to be used in each cylinder, 7 gallons.

Reduction in the amount of counterweight from that required for service conditions, 1,500 pounds.

10-inch disappearing carriage, L. F., model of 1896:

Amount of oil to be used in each cylinder, 7 gallons.

Reduction in the amount of counterweight from that required for service conditions, 1,450 pounds.

10-inch disappearing carriage, A. R. F., model of 1896:

Amount of oil to be used in each cylinder, 7 gallons.

Reduction in the amount of counterweight from that required for service conditions, 1,450 pounds.

12-inch disappearing carriage, L. F., model of 1896:

Amount of oil to be used in each cylinder, 11 gallons.

Reduction in the amount of counterweight from that required for service conditions, 2,350 pounds.

12-inch disappearing carriage, L. F., model of 1897:

Amount of oil to be used in each cylinder, 11 gallons.

Reduction in the amount of counterweight from that required for service conditions, 2,200 pounds.

In determining the amount of oil in each cylinder it is advisable to remove all the oil from the system and then replace the correct amount.

In reducing the amount of counterweight it should be noted that the reduction in pounds is made from that amount which is habitually used to raise the gun properly to the firing position, and the total amount of counterweight furnished with each carriage is not considered.

The amount of oil and counterweight above prescribed is based upon a setting of the throttling valve used for all service charges. The resistance to recoil can be further regulated by an adjustment of this valve within its limits, or by adding or withdrawing oil, as may be required. Efforts should not be made to control the length of recoil by increasing or decreasing the counterweight, which should in all cases be just sufficient to return the gun to battery and no more. (G. O. 111, 1902.)

EXPERIMENTAL ORDNANCE STORES.

Whenever experimental ordnance stores issued to troops for trial have been thoroughly tested and reports rendered, the officers charged with responsibility for such stores should report the facts to the Chief of Ordnance, U. S. Army, through military channels, in order that proper instructions for turning in the stores in case no further trials are necessary can be given. (G. O. 121, A. G. O., 1902.)

**INSTRUCTIONS RELATIVE TO MAKING REPAIRS OF FIELD BATTERIES AND FURNISHING
ORDNANCE STORES AND SUPPLIES.**

The following instructions relative to making repairs to field batteries and to furnishing ordnance stores and supplies to troops contained in General Orders, No. 5, A. G. O., 1903, should be carefully followed at all times:

Whenever the material of field batteries, or parts thereof, are in need of repairs requiring the services of skilled mechanics of the Ordnance Department, commanding officers thereof are authorized, with the approval of post commanders, to communicate directly with the officers of the Ordnance Department designated below, who have been instructed to comply with such requests and to furnish the necessary mechanics and materials. For this purpose applications should be made as follows: For the batteries stationed in the Department of the East, excepting Chickamauga Park, Ga., to the armament officer, central armament district, Army Building, New York, N. Y.; for the batteries stationed in the departments of the Lakes, the Missouri, the Colorado, and Dakota, and at Chickamauga Park, Ga., to the commanding officer of Rock Island Arsenal, Rock Island, Ill.; for the batteries stationed in the Department of Texas to the commanding officer of San Antonio Arsenal, San Antonio, Tex.; for the batteries stationed in the departments of the Columbia and California to the commanding officer of Benicia Arsenal, Benicia, Cal.; and for the batteries stationed in the Division of the Philippines to the commanding officer of the Manila Ordnance Depot, Manila, P. I.

Whenever parts of field-artillery material which do not require the services of an ordnance mechanic to attach them, and other standard ordnance stores and supplies (excepting guns, carriages, caissons, limbers, wagons, and ammunition) are required by field batteries, battery commanders are authorized, with the approval of post commanders, to send requisitions for the same direct, as follows: In the Department of the East to the commanding officer of Watervliet Arsenal, Watervliet, N. Y.; in the departments of the Lakes, the Missouri, the Colorado, and Dakota to the commanding officer of Rock Island Arsenal, Rock Island, Ill.; in the Department of Texas to the commanding officer of San Antonio Arsenal, San Antonio, Tex.; in the departments of California and the Columbia to the commanding officer of Benicia Arsenal, Benicia, Cal.; and the Division of the Philippines to the commanding officer of the Manila Ordnance Depot, Manila, P. I. The commanding officers of those arsenals, etc., have been instructed to furnish the supplies called for to the extent authorized by regulations.

Requisitions for guns, carriages, caissons, limbers, wagons, and ammunition required by field batteries serving in the Division of the Philippines will, as heretofore, be sent through military channels to the commanding officer of the Manila Ordnance Depot, Manila, P. I.; requisitions for such material required by field batteries serving in the United States will, as heretofore, be sent through military channels to the Chief of Ordnance, excepting that in the departments of California and the Columbia requisitions for ammunition will be sent through military channels to the commanding officer of Benicia Arsenal, Benicia, Cal.

The material of field batteries shall be subject at any time to the inspection of designated ordnance officers, including the firing of a piece if deemed desirable to see that it is in efficient service condition and to place it in such condition if it shall not be so. Division and department commanders will instruct post and battery commanders to furnish such assistance as may be necessary to carry out the inspections and to perform the necessary work contemplated by this order.

Whenever the following-named standard ordnance stores and supplies, viz, small arms, small-arms ammunition, infantry equipments, cleaning material, small-arms targets and material, reloading tools, stencil and marking outfits, arm racks, cavalry equipments, fencing implements, and saddler materials are required by post ordnance

officers and commanding officers of organizations other than field batteries, requisitions therefor will be forwarded to the division or department commanders who are authorized to send such requisitions direct to the arsenals, the commanding officers of which have been instructed to furnish the supplies required to the extent authorized by existing regulations.

DEPARTMENT OF THE EAST.

To the commanding officers, New York Arsenal, N. Y.; Watervliet Arsenal, N. Y., and Augusta Arsenal, Ga., depending upon the locality. Requisitions for small arms in this department may also be sent to Springfield Armory, Mass., and for small-arms cartridges to that armory and to Frankford Arsenal, Pa.

DEPARTMENT OF TEXAS.

To the commanding officer, San Antonio Arsenal, Tex., as heretofore.

DEPARTMENTS OF THE LAKES, THE MISSOURI, THE COLORADO, AND DAKOTA.

To the commanding officer, Rock Island Arsenal, Ill.

DEPARTMENTS OF THE COLUMBIA AND CALIFORNIA.

To the commanding officer, Benicia Arsenal, Cal., as heretofore.

DIVISION OF THE PHILIPPINES.

To the commanding officer, Manila Ordnance Depot, Manila, P. I.

Requisitions for ordnance stores and supplies, except as above noted, will, as heretofore, be forwarded through military channels to the Chief of Ordnance, U. S. Army, Washington, D. C., except in the departments of the Columbia and California, where requisitions will be forwarded through military channels to the commanding officer, Benicia Arsenal, Cal., and in the Division of the Philippines, where they will be forwarded through military channels to the commanding officer, Manila Ordnance Depot, Manila, P. I.

BRASS TRIMMINGS OF CONDEMNED STORES.

When leather or other stores belonging to the Ordnance Department are condemned by an inspector and ordered destroyed or broken up, all rings, buckles, and other trimmings of brass will be cut off by enlisted labor, when convenient, before the property is destroyed. The brass thus secured, after a sufficient quantity has accumulated to justify the cost of transportation, will be shipped to the Rock Island Arsenal, Rock Island, Ill., except in the Division of the Philippines, where it will be shipped to the Manila Ordnance Depot, for use in new manufactures or as scrap. (G. O. 5, A. G. O., 1903.)

MISCELLANEOUS PROVISIONS RELATIVE TO ISSUE OF ORDNANCE MATERIAL, ETC.

The methods described in the instruction pamphlets issued to battery commanders for the mounting, using, and care of the various guns and carriages will be strictly followed. (G. O. 68, A. G. O., 1897.)

For information by whom the work of mounting heavy guns, mortars, or carriages in fortifications shall be done, see circular 5, A. G. O., 1896.

Form 41-o "Statement of principal ordnance and ordnance stores on hand" will be forwarded to the ordnance officers at the headquarters of the departments by whom they will be transmitted to the Chief of Ordnance. (G. O. 132, A. G. O., 1901.)

Generally three coats of paint will be given seacoast carriages the first year, and two coats annually thereafter will probably suffice, the actual needs depending upon the climate, and local conditions. All steel and iron nonbearing surfaces both inside and out will be painted.

The following parts of carriages are not painted:

All wearing or bearing surfaces, which include the handles of handwheels and cranks, teeth of all gear wheels, teeth of crosshead pawls, teeth of crossheads, elevating-rack guides, rollers and surfaces on which they travel, piston rods, crosshead guides, etc.

The bronze sight holders will not be painted, nor will the azimuth and elevation scales and pointers and the followers of the stuffing boxes; these parts will be kept clean and, with the exception of the sight holders, will also be kept bright with rotten stone and oil or "Putz-Pomade."

The raised surfaces of letters and rims of direction and name plates are to be kept clean and bright; the remaining surface of these plates will be painted the same color as the carriage. (G. O. 200, A. G. O., 1899.)

The Lafin and Rand firing machine is no longer issued to the service. O. K. dry cells are issued instead.

O. K. dry cells No. 4 are issued for electric lighting and firing purposes on all rapid-fire guns; 10 cells are issued for each battery box for lighting, and 6 for each box used for firing purposes. The batteries heretofore issued to posts other than the O. K. dry cells will be replaced only when unserviceable.

Electric-firing batteries are furnished only to the batteries of rapid-firing guns and 12-inch B. L. mortars at this time.

It is expected that the new mechanisms for the 8, 10, and 12 inch B. L. rifles will be perfected to permit of their issue in the near future, when the electric-firing batteries will also be issued for these guns.

Some copper and leather gaskets will be found in use on seacoast carriages. When making requisition to replace these vulcanized fiber should be asked for. In making such requisitions there should be specified the model and caliber of the carriage and the exact joint where the gasket is to be used.

Gun carriages when about to be assembled are subject to inspection by officers of the Ordnance Department, both during process of erection and after completion in order to insure that all parts are correctly assembled and in proper working order. When engineer or artillery officers are about to commence work of erection they are required to notify the Chief of Ordnance, with a view to carrying out these provisions. (Cir. 19, A. G. O., 1898.)

In making requisition for gunner's (vent) gimlets, reamers, and punches for armament chests, the model and kind of gun for which required must always be given in the requisition before it can be filled.

Ammunition trucks are issued as follows:

With each 6-inch disappearing carriage, one.

With each 12-inch mortar carriage, two.

With each seacoast gun carriage above 6 inches, three.

For barbette carriages equipped with chain ammunition hoists a special model of truck is issued.

Installed armament shall be subject at any time to the inspection of ordnance officers, to be designated by the Chief of Ordnance, to see that it is in efficient condition for use, and to place it in such condition if it should not be so. Department commanders will instruct commanding officers to furnish such assistance as may be necessary to carry out the inspections and perform necessary work on the armament. (Cir. 19, A. G. O., 1898.)

Guns and carriages issued for service will in all cases be fully prepared for service before issue.

Door mats, dustpans, and shears for office use are not supplied to forts and posts by the Ordnance Department.

Wrapping paper and water buckets are not supplied to posts.

Lumber for skidding and shelves in ammunition and storerooms of emplacements is not furnished by the Ordnance Department.

Stencils for numbering and lettering guns and mortars with technical numbers will be furnished by the Ordnance Department. (A. R., 407, as amended by G. O. 82, A. G. O., July 18, 1902.)

Open tangent side sights for seacoast guns will be used on guns mounted on barrette carriages.

Butt hinges, hasps, staples, and padlocks and keys are supplied to the service for repairs to armament chests in such quantities as may be required from time to time.

Whenever a number of empty zinc or galvanized-iron powder storage cases sufficient to justify shipment have been accumulated at a post they will be shipped to the commanding officer of the U. S. Powder Depot, Dover, N. J., from all posts in the Department of the East and the Department of the Gulf; and to the commanding officer, Benicia Arsenal, from all posts in the Department of California and the Department of the Columbia; and the Chief of Ordnance should be notified of the shipment. (G. O. 9, A. G. O., 1900.)

Drawing pencils are the only pencils furnished by the Ordnance Department to posts. No scratch pads are provided.

Jackscrews are not supplied to posts.

Carpenter's tools for the mechanics at seacoast fortifications are not issued by the Ordnance Department. (G. O. —, A. G. O., 1902.)

All guns model 1888, 8-inch, 10-inch, and 12-inch rifles, or all guns on barbette carriages have four holes tapped in trunnion which take short bracket. If long brackets are sent care should be taken by ordnance officers to send drills and taps to drill the additional holes, as long brackets require six holes otherwise located.

The model of guns prior to August, 1894, was marked upon the end of the right trunnion, but subsequent to that date upon the face of the muzzle.

The number of the gun and place of manufacture are stamped upon the face of the muzzle. The numbers and models of all carriages for seacoast, field, siege, etc., can be found on the small brass plate attached to the side of the main frame of the large seacoast carriages and on the side plates of the trail of the field carriages generally.

The field guns, 3.2-inch, have the model of the gun stamped on the end of the right trunnion or the end of the left trunnion, if the right is fitted with sight brackets; the number of the gun is stamped on the muzzle.

Steel stamps for marking the azimuth circles of gun carriages are not issued to the post permanently, but will be loaned to posts temporarily for the completion of such work by the district ordnance officers.

Penthouses and other forms of shelter for seacoast artillery will not be provided. (Cir. 8, A. G. O., 1901.)

For use with the breech mechanisms of guns and their preservation the same lubricating oil is issued as for use with carriages. The specifications for this oil are as follows:

1. Free from acid or alkali when tested at ordinary temperatures and at a temperature of 150° F.
2. Free from ash and saponifiable oil.
3. Flash point, not below 400° F.
4. Specific gravity within limits of 0.900 and 0.910, or about 28° and 24° Baumé.
5. Cold test, or point at which flow ceases, not above 20° F.
6. Viscosity at 70° F. (tested by Seybolt viscosimeter, in use by the Standard Oil Company), within the limits of 200 and 250 seconds.

Hydrolene oil is now issued exclusively for use in cylinders of gun carriages. Officers receiving it are cautioned to use it by itself and not mix it with the old neutral oil in the cylinders or in any other manner. Before putting the hydrolene in the cylinders they should be thoroughly cleansed so as to leave no trace of acids, rust, or other detrimental matter. The specifications for hydrolene oil are as follows:

The oil is used to fill the cylinders and check recoil of the gun carriage by passing as a liquid through small orifices at the side of the piston head in motion.

It must fulfill the following requirements:

1. Entirely neutral and free from acid or alkali when tested at ordinary temperature and at a temperature of 150° F.
2. Free from ash and saponifiable oil and to show no trace of decomposition when heated to 200° F.
3. Specific gravity within the limits of 0.835 and 0.87, or 39° and 31° Baumé.
4. Cold test, or point at which flow ceases, not above 0° F.
5. Viscosity (tested by Seybolt viscosimeter in use by the Standard Oil Company), 40 seconds plus or minus 5 seconds at 70° F., and preferably to vary as little as practicable from this between limits of 30° and 100° F., but not to be greater than 70 seconds at 30° or less than 30 seconds at 100° F.

Ordnance officers are not authorized to remove from fortifications, or to give instructions to remove, any part of the armament without authority of the commanding general of the department in which the fortifications exist.

When it is necessary to remove parts of the armament for alteration or repair, request for the proper authority will be made to the headquarters of the department.

The breech mechanisms of the later models of all guns have all the respective parts marked with the number of the gun. Many of the guns of the earlier models, however, are in the service and their breech mechanisms are not so marked.

Wherever guns are mounted or in service without breech mechanisms so marked, this will be done by the district ordnance mechanics upon application to the district ordnance officer. This is desirable, especially on such parts as are not perfectly interchangeable.

For convenience in making requisitions, invoices, receipts, etc., the use of the collective or "group names" is authorized, which are printed at the left of the tables of parts of breech mechanisms in this manual. These names will be understood to include the items embraced in the respective brackets in those tables.

Except where expended immediately upon receipt, such articles will be taken up on the return, item by item. When immediately expended as a whole they may be taken up and dropped by the group name.

"Monkey wrench" and "screw wrench" are synonymous terms.

In making requisition for parts of guns or carriages it should be designated clearly and fully the gun or carriage for which the parts are needed, giving the caliber, model, number, and place of manufacture of either. The parts should be given their full official names as shown in the various lists contained herein.

The remarks in tables opposite the names of parts should also be carefully noted, as to whether the part is interchangeable and whether issued separately or in conjunction with others, to which it must be fitted at the place of manufacture. It is not sufficient to fix definitely any given gun by referring to it simply by the number and model, as there are several series of consecutive numbers of guns made at different places. Therefore, the place of manufacture of gun must invariably be given.

In many places in the breech mechanisms of the various guns—field, siege, and sea-coast—hardened tool-steel pallets are inserted and secured in place by screws which are tightly set home and then riveted. These pallets are not in any case to be removed or new ones inserted except at the gun factory. They are not regarded as separate parts of the mechanism and are therefore not mentioned in the tables of parts given in this manual.

Ten-inch and 12-inch B. L. rifles, model 1895, are fitted for central sights, front and rear only, screw holes for same being filled with brass plugs on all guns issued to be mounted on disappearing carriages; the central sights, as well as side sights, to be issued only for guns to be mounted on barbette carriages.

The tools and implements for the earlier model seacoast carriages and contained in the implement chests issued with such carriages and heretofore considered a part of the carriage complete should be taken up on the property returns of posts and accounted for as one implement chest complete for carriage.

For the later model guns and carriages, and all future guns and carriages, the armament chest is a combination chest, including both the tools for the gun and carriage, and will be accounted for on the returns as one combination armament chest complete, under the headings provided for the purpose.

The armament chest for guns of the earlier model will be taken up and accounted for as one armament chest complete.

One combination chest is issued for the tools and implements for a pit or group of four 12-inch mortars and their carriages, accounted for as provided for the armament and implement chest in previous paragraphs.

These various chests, single or combined, when taken up complete, are supposed to contain the complete complement of tools, etc., as enumerated on the last pages of the fort return, Form 1f, issued by the Ordnance Department, U. S. Army.

If at any time there be a deficiency in either of these chests, this fact should be noted by a footnote on the return until such a time as the deficiency is made up by a new issue, when this fact will also be noted on the return.

Ammunition trucks for seacoast carriages, although issued with the carriages, should be invoiced separately and carried separately on property returns of the post under headings provided for the purpose.

In making requisition for an armament chest, designate the caliber, kind, model, number, and place of manufacture of the gun or mortar, and the kind, model, number, and place of manufacture of the carriage on which either the gun or mortar is mounted.

In making requisition for any tool, implement, or article of any kind give the full official designation of the article as per the list shown under the respective headings herein. Also, in addition, the calibers, kind, model, number, and place of manufacture of the gun, or the kind, model, number, and place of manufacture of the carriage for which required.

None of the model 1895 8-inch, 10-inch, or 12-inch B. L. rifles, on account of their muzzle preponderance, can be mounted on barbette nondisappearing carriages.

There are issued to the service oil drip pans for use with modern disappearing and barbette seacoast carriages for attachment to the stuffing boxes. They are issued in quantities of four for each disappearing carriage, two for each barbette carriage, three for each gun-lift carriage, and one for each barbette carriage on balanced pillar mounting. The prices of these pans are as follows:

	Price.
8-inch disappearing carriage.....	\$0. 35
10-inch disappearing carriage.....	0. 35
12-inch disappearing carriage.....	0. 35
8-inch barbette carriage.....	0. 25
10-inch barbette carriage.....	0. 25
12-inch barbette carriage.....	0. 25
10-inch alternate lift carriage.....	0. 35
5-inch barbette carriage on balanced pillar mounting	0. 25

Seven pairs of shot tongs are issued for each seacoast carriage for guns of 6-inch caliber and above. One pair is issued with each seacoast mortar carriage.

Black and olive paints are prepared and issued as "black paint" and "black paint,

quick drying." The quick-drying paints are issued for use with the batteries of field artillery. The ordinary paints are issued for use at seacoast and other posts.

Horse equipments will not be issued to officers on temporary mounted duty excepting acting ordnance officers at posts.

Sales of arms, equipments, etc., can not be made to retired officers.

Arms will be supplied temporarily by post commanders to Hospital Corps attachments when necessary for protection, the arms to be returned to the organization from which they came when the emergency for their use has passed.

Gallery practice reloading tools for caliber .30 rifle and carbine, reloading tools for shotguns, and decapping and priming tools for seacoast guns which can not be repaired at a post by the use of the necessary parts on hand or to be supplied are not to be turned in to be replaced by new tools, and authority should be obtained to turn them into Frankford Arsenal to be repaired and returned.

In making requisitions for ordnance and ordnance supplies, in giving the nomenclature the name of the article should be used first at all times, following with the qualification of the kind of article, if any, e. g.: Sabers, light artillery; bridles, curb, cavalry; attachments, saber, etc.

Indelible ink is supplied for marking equipments, but not for marking clothing.

In ordering snap hooks the requisition should clearly state the kind of snap hook required and the number of each, e. g., double snap, cavalry canteen snap, halter snap, etc. The requisition should not be made out for "snap hooks, assorted." Requisitions made in this manner will require either their being returned or necessitate correspondence to get the information required as to the kind of hooks needed, thus causing unnecessary delay in filling the requisition.

Organizations equipped with horse equipments, harness, etc., in making requisition for leather and other supplies, should specify the kind of leather equipments with which the company, troop, or battery are equipped; if equipped with both fair and black leather equipments, the quantity of each.

Companies changing station will take with them all ordnance stores in their possession, except where companies of the same arm of the service exchange stations. (G. O. 67, A. G. O., 1887.)

Sand glasses rendered unserviceable should not be condemned and destroyed, but sent to the office of the Chief of Ordnance for repairs.

Three grades of sand glasses are issued—10, 20, and 30 second. The 30-second glasses are issued to seacoast posts at the rate of two per post, to the ordnance officer of the post only.

The 10, 20, and 30 second glasses are issued to each troop of cavalry and company of infantry and engineers at the rate of one set (one of each grade) to each troop or company. (Price each, 85 cents.)

PUBLICATIONS ISSUED BY THE CHIEF OF ORDNANCE, U. S. ARMY.

AMMUNITION, EXPLOSIVES, ETC.

Instructions for loading and crimping cartridges.

Hand tools for reloading small-arm cartridges.

Bench reloading tools.

Summary test of smokeless powder. (Appendix 38, 1900.)

Test of jovite. (Appendix 10, 1898.)

Test of thorite. (Appendix 40, 1900.)

Directions for drying and blending powder at forts.

Description of 3.2-inch and 3.6-inch shrapnel. (Appendix 7, 1896.)

Instructions for regulating powder charges of coast artillery in target practice.

List of tools for reloading caliber .30 gallery practice cartridges, etc.

CARRIAGES.

Instructions for mounting, using, and caring for—
 5-inch barbette, model 1896 (balance pillar mount).
 5-inch barbette, model 1902.
 8-inch barbette, model 1892.
 6-inch disappearing L. F., model 1898.
 6-inch disappearing L. F., model 1903.
 6-inch barbette, model 1900.
 8-inch disappearing L. F., model 1894.
 8-inch disappearing L. F., model 1896.
 10-inch disappearing L. F., model 1894.
 10-inch disappearing L. F., model 1896.
 10-inch disappearing A. R. F., model 1896.
 10-inch disappearing, model 1901.
 12-inch disappearing L. F., model 1896.
 12-inch disappearing L. F., model 1897.
 12-inch disappearing, model 1901.
 12-inch mortar, model 1891.
 12-inch mortar (steel), model 1896.

GUNS AND CARRIAGES, ON MOUNTS.

Handbook for 1 pounder (37 mm.—1.457") Maxim quick-fire gun (pompom).
 Vickers-Maxim (75 mm.—2.95") quick-firing mountain gun.
 Handbook for 6-pounder rapid-fire gun on parapet mounts.
 Instructions for mounting, using, and caring for 15-pounder rapid-fire guns and masking parapet mounts.
 Instructions for 6-inch quick-firing Armstrong gun and pedestal mounting (barbette carriage).
 Instructions for 4.7-inch quick-firing Armstrong gun and pedestal mounting (barbette carriage), 40 caliber.
 Instructions for 4.7-inch quick-firing Armstrong gun and pedestal mounting (barbette carriage), 45 caliber.
 Instructions for 4.7-inch quick-firing Armstrong gun and pedestal mounting (barbette carriage), 50 caliber.
 Handbook of 3-inch field battery material.

EQUIPMENT AND EQUIPPING.

Material for 3.2-inch battery, six guns (handbook).
 Material for 5-inch siege battery (handbook).
 Material for 7-inch siege howitzer battery (handbook).
 Lists of articles in armament chests.

FUSES.

Fuses for field, siege, and seacoast powder charge, shell and shrapnel, and detonating fuses.

GUNS, CANNON, ETC.

United States Army cannon, 1899 (table).
 United States Army rapid-fire guns, 1901 (table).
 Nomenclature of 3.2-inch field guns, wagon, and caisson.
 Test of Hotchkiss automatic gun. (Appendix 14, 1900.)
 Test of Colt's automatic gun. (Appendix 13, 1900.)
 Test of Maxim and Vickers machine gun. (Appendix 12, 1900.)

Description of Gatling gun. (Appendix 2, 1896.)
 Description of breech mechanism, seacoast cannon.
 Description of the Colt automatic machine gun, caliber .30.
 Description and instructions for the use of 5 and 6 inch R. F. guns.
 Instructions for using, mounting, and dismounting 1-pounder subcaliber tubes.
 Instructions for the care and preservation of rapid-fire guns.

MISCELLANEOUS.

Test of Isham 12-inch explosive shell. (Appendix 39, 1900.)
 Dudgeon's hydraulic jacks.
 Graphic range tables.
 Crusher gauges for cannon tools and accessories.
 Mounting modern ordnance (Kelton).
 Ordnance property regulations.
 Ordnance supply manual.
 Price list (1903).
 Rendition of property papers.
 Description and use of plotting boards with zinc top.
 Handbook of the Hotchkiss 1.65-inch (2-pounder) mountain gun.
 Range and battery commander's tables for all seacoast guns.
 Winchester repeating shotgun, rules for management.
 Modern gun construction and breech mechanism (Birnie).
 Description and instructions for use of the Boulengé chronograph.
 Instructions for use of safety lanyard attachment.

PAINTS, OILS, ETC.

Paints for field guns and carriages.
 Estimates of paints for seacoast carriages.
 Paints for projectiles.
 Distinctive colors for projectiles (chart).

SIGHTS, RANGE FINDERS, ETC.

Tests of telescopic sights for rifle. (Appendix 16, 1900.)
 Handbook of sights for cannon.
 Instructions for care of telescopic sights.
 Instructions for inspection of Scott's telescopic sights.
 Instructions for repairing cross hair on telescopic sights.
 Berdan range finder.
 Instructions for observation of fire.
 Lewis range and position finder, Type A and B.
 Relocator for use with range and position finder (Rafferty).
 Deviation index, a mechanical indicator for correcting angles (Rafferty).
 Azimuth instrument (model 1900), description of.
 Description and instructions for use of Weldon range finder.
 Description of Rafferty depression position finder, Type B.
 Description of Swasey position finder, Type A.
 Description and instructions for use of Pratt's ballistic board.

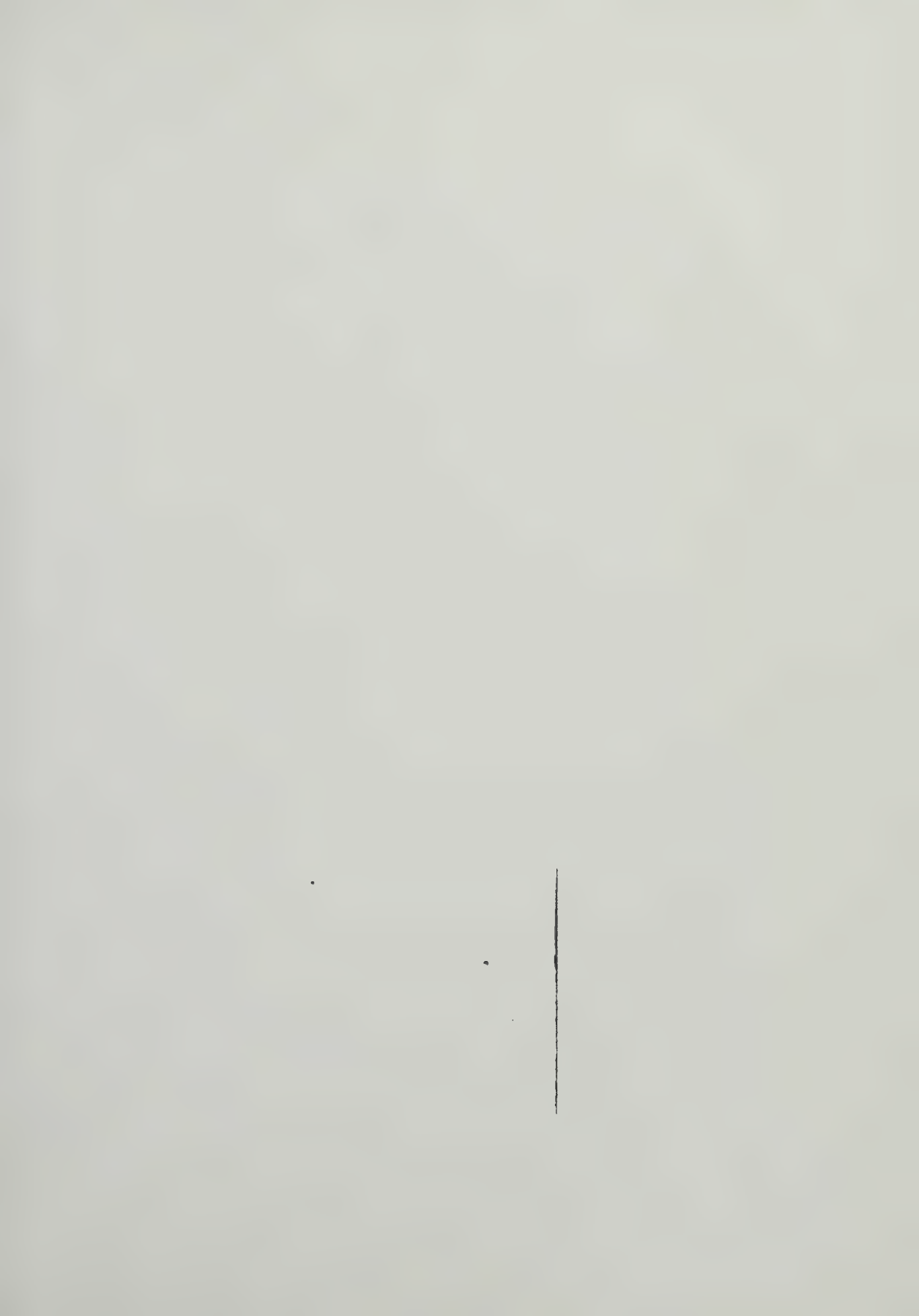
SMALL ARMS.

Description and rules for management of Springfield rifle (caliber .45).
 Description and rules for management of Springfield carbine.
 Description and rules for management of United States magazine rifle (caliber .30).
 Description and rules for management of United States magazine carbine.

Description of Colt's double-action revolver, models 1894 and 1896.
 Report on automatic pistols. (Appendix 15, 1900.)
 Test of caliber .38 revolver. (Appendix 8, 1899.)
 Table of fire United States magazine rifle and carbine. (Appendix 10, 1897.)
 Description and rules for management of United States magazine rifle model 1903

TARGETS.

Description of artillery and small-arms targets.
 Equipment of target ranges for small-arms firing.



INDEX.

A.	Page.
Accessories, list of:	
Colt's automatic machine gun, caliber .30.....	566
6-pounder gun and carriage, American Ordnance Company (Driggs-Schroeder), Mark II...	288
6-pounder R. F. gun and mount, American Ordnance Company (Driggs-Schroeder), Mark III.	288
6-pounder R. F. gun and mount, Driggs-Seabury, model 1898.....	290
6-pounder R. F. gun and mount, Driggs-Seabury, model 1898, modified.....	291
6-pounder mounts, rampart, American Ordnance Company (Nos. 1 to 10)	293
1.65-inch Hotchkiss mountain gun (Paris model)	582
1.65-inch Hotchkiss mountain gun (American model)	583
2.95-inch mountain gun and carriage (Vickers-Maxim).....	547-548
For sub-caliber tubes:	
4-inch R. F. gun (Driggs-Schroeder)	281
4.72-inch R. F. gun (Armstrong).....	271
5-inch R. F. gun, O. D. model 1897.....	226-226
6-inch R. F. gun, O. D. model 1897.....	241
6-inch R. F. gun, model 1900.....	242
6-inch R. F. gun (Armstrong)	279
8-inch B. L. rifles	22
10-inch B. L. rifles	70
12-inch B. L. rifles	143
12-inch B. L. mortars, models 1886, 1890, and 1890 MI	206
Colt's automatic machine gun, caliber .30, not expendable	570
6-pounder R. F. guns, Marks II and III, American Ordnance Company (Driggs-Schroeder), are not interchangeable	289
Accessories and tools, list of, for artillery store, wagon (new model).....	498
Adaptors:	
For—	
4.72-inch R. F. guns (Armstrong).....	270
6-inch R. F. guns (Armstrong).....	277
Adjusting nut binding screw. See Screws.	
Ammunition:	
Allowance for expenditure, by commandants of artillery schools.....	558
Ball and blank, not to be dropped from returns until expended.....	568
Blank service, caliber .30, can be used with Colt's automatic gun.....	570
Blank, caliber .30, will not operate in Gatling gun, etc.....	590
Expended without orders by soldiers, to be charged, etc.....	596
For—	
Colt's automatic gun, caliber .30.....	570
6-pounder R. F. guns, to be packed in boxes, zinc-lined and hermetically sealed.....	296
6-pounder R. F. guns, interchangeable all guns of this caliber	294
1.457-inch Vickers-Maxim gun, how carried, etc.....	574
1.65-inch mountain gun.....	533
2.95-inch (75 mm.) Vickers-Maxim mountain gun.....	543-544
3-inch Hotchkiss mountain gun.....	540
4-inch R. F. gun (Driggs-Schroeder).....	260
5-inch siege rifle, packed, two rounds in case, etc.....	401
7-inch B. L. howitzer, how packed, etc.....	423
Field and siege guns, issued, filled and fused	342
Gatling guns.....	565
Practice at moving targets, to be shot or plugged shell only, etc.....	341
Subcaliber tubes, 15-pounder R. F. gun, service caliber .30 must not be used.....	297
Target practice, additional allowance for field batteries deprived of practice, etc	354

	Page.
Ammunition—Continued.	
For—	
Target practice to be determined and announced annually in general orders.....	355
Target practice, requisition to be made three months in advance.....	343
Target practice for 6 and 15 pounder R. F. guns to be specially marked.....	341
Furnished civilians, to be dropped only when expended in action, etc.....	505
Gallery practice, caliber .80, allowance of, etc.....	356
Gallery practice, allowance of, to certain field batteries.....	336
High explosive, weight of charges.....	334
Mortars, artillery district commanders to determine proportion of supply.....	594
Officer's certificate necessary for all expenditures, etc.....	343
Requisition for reserve, to be made only when suitable magazines available, etc.....	343
Reserve, seacoast, allowance of.....	356
Saluting charges metallic ammunition to be assembled at post.....	356
Saluting charges. <i>See</i> Powder.	
Shotgun—	
Components for, may be sold to men, etc.....	605
Components for, not to be issued to service.....	605
Cost at which sold, etc.....	605
For foreign service, loaded in metallic shells.....	605
Nos. 4-6 and 8 (shot) cartridges, only issued.....	605
Small arms—	
Aggregate allowance to be expended by direction of department commanders, etc.....	594
Allowance of, in exchange for empty shells.....	592
Not accumulative, lapses with target year.....	594
Target practice to be on basis of definite number of rounds per man, etc.....	591
Published in general orders.....	591
Amount of reserve supply to be kept on hand, etc.....	594
Company commanders to keep permanent records of expenditures, etc.....	594
Excess expenditures to be charged to accountable officer.....	594
May be expended in hunting, etc.....	594
May be sold to certain civilian employees for hunting, etc.....	594
Not furnished to acting assistant surgeons.....	592
Not to be sold to Indians.....	594
Present allotment of, for target practice, etc.....	592
Prices of (small arms).....	592
Target practice, Indian scouts on same footing as regular troops.....	592
Value of, to be published annually, etc.....	592
Special for subcaliber tubes—	
6-pounder R. F. gun, caliber .30.....	294
15-pounder R. F. gun, caliber .30.....	297
6 and 15-pounder R. F. guns, service caliber .30 not to be used.....	294-297
Supply to be kept on hand—	
3.2-inch field battery.....	517
5-inch B. L. siege rifle battery.....	413
7-inch B. L. howitzer battery.....	432
Table showing kinds, dimensions, etc., for—	
Field artillery.....	336-339
Mountain guns.....	336
Rapid-fire guns.....	337
Seacoast artillery.....	340
Siege artillery.....	339
Will only be expended in action, defense of life, etc.....	594
Ammunition chests, 3.2-inch calson, limber, etc., three models, principal differences, etc.....	498
Ammunition pack. <i>See</i> Pack.	
Ammunition trucks, list of parts, material, correct nomenclature, etc.:	
8-inch disappearing carriage, L. F., model 1894.....	83-84
8-inch disappearing carriage, L. F., model 1896.....	41-42
10-inch disappearing carriage, L. F., model 1896, Nos. 1 to 30.....	94-95
10-inch barbette carriage, model 1893.....	78
10-inch disappearing carriage, L. F., model 1896, Nos. 31 to 70.....	95-96
10-inch disappearing carriage, L. F., model 1896, after No. 70.....	96-97
10-inch disappearing carriage, A. R. F., model 1896.....	106-107
12-inch barbette carriage, model 1892.....	151
With chain ammunition hoists.....	151
12-inch disappearing carriage, L. F., model 1901.....	179
12-inch disappearing carriage, L. F., model 1897.....	164
12-inch disappearing carriage, L. L., model 1896.....	158-159

Ammunition trucks, list of parts, material, correct nomenclature, etc.—Continued.	Page.
12-inch mortar carriage, model 1896	215
Allowance of, for issue	676
For carriages, to be accounted for separately	678
Anemometers and clocks not issued by Ordnance Department	816
Aparejo, modified, to be used with 2.95-inch pack outfit modified	565
Armaments:	
Districts for repair, etc., list of	367
Installed, subject to inspection of ordnance officers, etc., aid to be rendered them, etc.	676
Not to be removed from posts without authority of commanding general	677
Seacoast, repairs of. <i>See</i> Repairs.	
Armament chest, combination, contents of, for—	
Four 12-inch B. L. mortars, cast iron B. H., models 1886 and 1886 M; and four 12-inch mortar carriages, model 1891	216-217
Four 12-inch B. L. mortars, cast iron, model 1886 and 1886 M; and four 12-inch mortar carriages, model 1896	217-218
Four 12-inch B. L. mortars, models 1890 and 1890 M; and four 12-inch carriages, model 1891 ..	218
Four 12-inch B. L. mortars, models 1890 and 1890 M; and four mortar carriages, model 1896 ..	218
6-inch B. F. gun, model 1900, and 6-inch barbette carriage (pedestal mount), model 1900 ..	257-258
6-inch R. F. gun, model 1897, and disappearing carriage, L. F., model 1896	257
8-inch B. L. rifle, model 1888, and 8-inch disappearing carriage, L. F., model 1896	45
10-inch B. L. rifle and barbette carriage, model 1893	111
10-inch B. L. rifle, model 1895, and disappearing carriage, model 1896	112
10-inch B. L. rifle, model 1888, and 10-inch disappearing carriage, L. F., model 1896	112
12-inch B. L. rifle, model 1900, and disappearing carriage, L. F., model 1901	184
12-inch B. L. rifle, model 1895, and disappearing carriage, L. F., model 1897	188
Armament chests, contents of, for—	
3.6-inch B. L. mortar and carriage	629
5-inch B. L. rifle, siege, and carriage	418
5-inch B. F. gun, model 1897	232-238
6-inch R. F. guns, model 1897-1897 M1	256-267
7-inch B. L. mortar, model 1892, and carriage, model 1896	438-439
8-inch B. L. rifles, models 1888-1888 M1 and 1888 MII	48
10-inch B. L. rifles, models 1885-1885 M1 and 1900	109
10-inch B. L. rifles, models 1888-1888 M1 and 1888 MII	109
12-inch B. L. rifles, model 1888	181
12-inch B. L. rifles, models 1895 and 1900	182
For seacoast guns, sizes of	552
Hinges, etc., furnished for repairs	676
Requisitions for, how made	678
With tools, etc., how accounted for	678
Arms:	
Boxes containing same to be sealed and stamped, etc	645
Issued to States and Territories, to be turned over to Quartermaster's Department for transportation	645
May be drawn by officers, etc	600
Officers held responsible for secure packing, etc	645
To be supplied temporarily to Hospital Corps detachments	679
Arm racks:	
Metal parts of	642-648
Portable—	
Not issued to troops at posts	367
Not issued to posts	628
Revolver, allowance of, for issue to—	
Field batteries	516
Siege batteries	455
Artillery store wagon. <i>See</i> Wagon.	
Asphalt varnish. <i>See</i> Varnish.	
Attachment, lanyard, safety. <i>See</i> Safety lanyard attachment.	
Automatic guns:	
Colt's, caliber .30—	
Component parts of	565-567
Front sight for	567
Principal weights and dimensions of	567
To be provided with improved sights, 2,000 yards	567
Barrels, extra, issued with	570
To whom issued	565

	Page.
Automatic guns—Continued.	
1.457-inch Vickers-Maxim, component parts of	572-574
1.457-inch (Vickers-Maxim), how issued	572
List of equipments—	
1.457-inch Vickers-Maxim mountain guns and carriages 4669 to 4680	576-577
Later than 4680	577-578
Auxiliary scales. <i>See</i> Scales.	
Azimuth instruments:	
Allowance of, for issue to—	
5-inch siege batteries	408
Howitzer batteries	42
Illuminating device for. <i>See</i> Illuminating device.	
Issued for use in horizontal base systems	901
To siege batteries, allowance of	516
Warner & Swasey, model 1900—	
List of parts of, etc.	33
Principal improvements embodied therein	33
Azimuth pointers. <i>See</i> Pointers.	
B.	
Badges, gunners:	
Lost by carelessness to be charged to soldier	36
Will be duplicated, etc.	36
Supplied by Ordnance Department	36
To be dropped from return	36
To be retained by soldier	36
Bags, canvas, for lanterns, issued to field batteries	51
Balances and weights (submarine mine material), components of set	281
Balata washers. <i>See</i> Washers.	
Ball bearing, pivot, complete (spare) 6-pounder Driggs-Seabury mounts	22
Ball bearings (spare):	
6-inch disappearing carriage, L. F., model 1898, issued to district armament officers	25
10-inch carriages, issued to district armament officers	10
12-inch carriages, issued to district armament officers	136
Balls, antifriction (spare):	
4.72-inch R. F. gun mounts	271
6-inch R. F. mount (Armstrong)	270
Balls, for upper antifriction washers (spare), 4-inch recoil mounts (Driggs-Schroeder)	32
Ballistic boards, Pratt's:	
Adopted as service instrument, allowance of, etc.	317
Description of	317-318
Ballistic data, latest for field, siege, rapid-fire, and sea-coast guns	50
Bands, for 10-inch disappearing carriage	145
Barometers, not issued by Ordnance Department	316
Barrell, United States magazine rifle, caliber .30, model 1903, not to be unscrewed from receiver.	59
Barrels, extra, issued with Colt automatic machine guns	573
Bases, for Lewis and Raftery depression position finders, allowance of, etc.	36
Battery, composition of:	
1.65-inch mountain gun	534
2.95-inch mountain gun	549
3-inch Hotchkiss mountain guns	542
3.2-inch field	455
3.6-inch rifles	523
3.6-inch mortars, not determined	522
5-inch siege guns	586
7-inch Howitzers	404
7-inch mortars, not determined	482
Gatling gun	587
Battery, electric, complete (spare):	
4.72-inch R. F. gun mounts	271
6-inch R. F. mounts (Armstrong)	279
Batteries, storage (submarine mine material), list of parts of	387
Bayonet rod, use of, prohibited in cleaning rifle	594
Bayonets to be kept in scabbards in quarters	595
Belleville spring washers. <i>See</i> Washers.	
Belts:	
Cartridge, caliber .30, outer and inner loops to be filled, etc.	634
Cavalry, loops for revolver ammunition not to be used on marches, etc.	634
Caliber .30, different from infantry belt	633
New woven cartridge belt for service with new rifle, adopted, description of, etc.	625

Belts—Continued.	Page.
Reloading machine—	
Colt automatic gun, caliber .30, number issued, etc.....	568
Component parts of.....	568-569
With 120 cartridges for Colt gun, to be used in service only.....	570
Cartridge (woven), to be supplied with eyelets for first aid packages.....	633
Gray woven, adopted as service belt, etc.....	633
Leather waist, issued to service, etc.....	633
Special for target practice use for Colt automatic gun.....	570
Waist, with saber attachments, issued to mounted service, etc.....	633
Bits:	
Curb, proportion in which supplied to cavalry.....	629
Shoemaker, obsolete, not issued.....	629
Blades, sword, can not be sold alone.....	618
Blinders, for army mules, allowance of, for issue.....	539
Block. <i>See</i> Breechblock (all models of guns):	
Block:	
8-inch single, issued to siege batteries.....	446
8-inch double, issued to siege batteries.....	446
Block carrier, complete:	
3.2-inch B. L. rifle, model 1886.....	459
Model 1897.....	461
3.6-inch B. L. rifle, model 1891.....	522
3.6-inch B. L. mortar, model 1890.....	524
4.72-inch R. F. gun (Armstrong).....	266
5-inch B. L. rifle, siege, model 1890.....	394
5-inch B. L. rifle, siege, model 1898 and 1898 Mi.....	397
6-inch R. F. gun (Armstrong).....	273
7-inch B. L. howitzer, model 1890.....	415
7-inch B. L. howitzer, model 1898.....	418
7-inch B. L. mortar, model 1892.....	433
Block carrier (spare):	
4.72-inch R. F. gun (Armstrong).....	270
6-inch R. F. gun (Armstrong).....	278
Block latch, complete:	
4.72-inch R. F. gun (Armstrong).....	267
6-inch R. F. gun (Armstrong).....	274
Block-locking spring. <i>See</i> Spring.	
Block stop, complete (spare):	
4.72-inch R. F. gun (Armstrong).....	270
6-inch R. F. gun (Armstrong).....	278
Blocks, iron pulley (for seacoast):	
Component parts of.....	378-379
Principal dimensions of.....	381
Blocks, pulley, list and allowance of, for 3.2-inch field battery.....	508
Boards of survey, regulations pertaining thereto.....	664-666
Body, metallic, forge and battery wagon, to be turned in if seriously damaged, etc.....	506
Bolt:	
Guide (spare) 4-inch R. F. gun (Driggs-Schroeder).....	280
Top, elevating pointer (spare), 5-inch barbette carriage, balanced pillar mount, model 1896.....	232
Valve key (spare), 4.72-inch R. F. gun mount.....	271
Dust guard (spare)—	
6-inch disappearing cartridge, L. F., model 1898.....	256
8-inch disappearing and barbette carriages.....	42
10-inch disappearing and barbette carriages.....	108
12-inch B. L. mortar carriages.....	216
12-inch carriages.....	180
For covers of pedestal (spare), 6-inch barbette carriage (pedestal mount), model 1900.....	256
For rope clamp (spare)—	
8-inch carriage.....	42
10-inch carriage.....	108
12-inch carriage.....	180
Lifting-pinion cover top (spare), 5-inch barbette carriage, balanced pillar mount, model 1896.....	232
Platform ladder (spare)—	
8-inch disappearing carriage.....	42
10-inch disappearing and barbette carriage.....	108
12-inch carriage.....	180

	Page
Bolts —Continued.	
Running out spring (spare)—	
4.72-inch R. F. gun mounts	27
6-inch R. F. mount (Armstrong)	29
Throttling bar (spare)—	
6-inch disappearing carriage, L. F., model 1896	28
8-inch disappearing and barbette carriages	28
10-inch disappearing and barbette carriages	16
12-inch disappearing carriages	17
Throttling bar with washers (spare), 5-inch barbette carriage, balanced pillar mount, model 1896	13
Top racer hand-hole cover (spare), 5-inch barbette carriage, balanced pillar mount, model 1896	18
Box for cleaning materials:	
Is not expendable	67
Issued to replace old ones only when unserviceable	67
Boxes:	
For—	
Gun commanders' range scales, allowance of, etc.	32
Ocean transportation, to be strapped with wire, etc.	68
Packing—	
List of sizes, weights, and contents issued by Ordnance Department	64-65
Special, for 3.2-inch to 3.6-inch shell and shrapnel	65
Brackets:	
For—	
Rear (side) sights, 8, 10, and 12 inch rifles, flat or curved, requisition should state which ..	25
Slide contact (spare), 6-inch R. F. gun, model 1900	26
Slide contact (spare), 5-inch R. F. gun, model 1897	26
Sight, for—	
3.2-inch B. L. rifle, model 1897, two forms of, etc.	42
7-inch B. L. howitzer, new form to be applied, etc.	47
Trunnion, not to be removed when painting	26
Telescopic sight for—	
3.6-inch B. L. rifle, model 1891, two forms of, etc.	22
5-inch B. L. rifle, siege, model 1890, new form to be supplied, etc.	23
Telescopic sight—	
Instructions for making requisition for	21
List of and how attached, etc.	33-34
Brake rope. See Ropes.	
Brake shoes:	
Bronze to take the place of cast iron	34
Cast-iron, to be replaced by bronze ones	34
Brakes, bow and spring, 3.2-inch carriage, considered part of carriage	35
Brass trimmings, of condemned ordnance stores, how to be disposed of.	65
Breast straps, not included in officer's horse equipments, made especially	62
Breech-block, complete, list of parts:	
3.2-inch B. L. rifle, model 1896	49
Model 1897	461-47
3.6-inch B. L. rifle, model 1891	47
3.6-inch B. L. mortar, model 1890	47
4.72-inch R. F. gun (Armstrong)	47
5-inch B. L. rifle, siege, model 1890	47
Model 1898 and 1898 M1	49
5-inch R. F. gun, O. D., model 1897	47
6-inch R. F. gun, (Armstrong)	47
6-inch R. F. guns, O. D., models 1897, 1897 M1, and 1900	47
7-inch B. L. howitzer, model 1890	49
Model 1898	49
7-inch B. L. mortar, model 1892	49
8-inch B. L. rifle, model 1888	47
Model 1888 M1	47
Model 1888 M11	47
Ten-inch B. L. rifle, model 1888	47
1888 M1	47
1888 M11	47
1896	47
1896 M1	47

Breech-block, complete, list of parts—Continued.

	Page.
12-inch B. L. rifle, model 1888	115
1888 M I.....	120
1888 M I½	126
1888 M II.....	130
1895	185
1895 M I.....	188
12-inch B. L. mortar, model 1886	185
1886-1890 M I.....	196
1890 (steel).....	190
1890 M I (steel)	200
Breechblock oil-hole screws (spare). <i>See</i> Screws.	
Breech covers, list of, supplied, etc.....	308
Breech mechanism of—	
1.65-inch Hotchkiss mountain gun, changed to percussion firing	581
8-inch Hotchkiss mountain guns altered to percussion firing.....	540
8-inch Hotchkiss mountain gun (percussion firing), parts of, not interchangeable.....	540
Component parts of 4-inch R. F. guns (Driggs-Schroeder)	259
How packed to prevent moving, etc.....	646
Later model of guns have parts marked with number of gun, etc.....	677
Old model, parts not marked to be marked by district ordnance mechanics, etc.....	677
Breech straps:	
3.2-inch carriage, considered part of carriage.....	500
For siege carriage, issued as part of carriage	460
Breech screw. <i>See</i> Breechblock.	
Breech-screw carrier. <i>See</i> Block carrier.	
Bridles, supplied with bits if called for	629
Bristles, not issued to cavalry	632
Brooms, corn, issued only for, allowance of, etc.....	361
Brush, cleaning (spare), 6-pounder Driggs-Seabury mounts.....	232
Brushes:	
For gallery targets, issued, etc.....	516
Not expendable.....	516
Paste for small-arms targets, allowance of, etc.....	518
Buckets, water, not supplied to posts.....	676
Buckles, to be substituted for waist-belt plate.....	638
Buffers:	
Felt, complete (spare), 12-inch B. L. mortar carriages.....	218
Rubber, for oscillating slide (spare), 15-pounder R. F. gun mount.....	299
Bullets for—	
Caliber .30 and .38 ball cartridges, not issued.....	561

C.**Cables:**

Direct circuit (spare)—	
4.72-inch R. F. gun mount	271
6-inch R. F. mount (Armstrong).....	279
Electric firing (spare) 5-inch barbette carriage, balanced pillar mount, model 1896.....	232
For electrical firing apparatus (spare)—	
8-inch disappearing carriages.....	48
10-inch disappearing carriages.....	108
12-inch carriages.....	180
12-inch B. L. mortar carriages.....	216
For lighting (spare) 5-inch barbette carriage, balanced pillar mount, model 1896	232
With contacts—	
Battery to pistol (spare)—	
4.72-inch R. F. gun mount	271
6-inch R. F. mount (Armstrong).....	279
Cradle to gun (spare)—	
4.72-inch R. F. gun mount.....	271
6-inch R. F. mount (Armstrong).....	279
Pistol to cradle (spare)—	
4.72-inch R. F. gun mount.....	271
6-inch R. F. mount (Armstrong)	279

Calison:

For 3.6-inch B. L. rifle.....	590
List of parts, material, nomenclature, etc., for 3.2-inch field gun	431-433
To replace ammunition wagons for siege batteries	398-414

	Page
Canteen straps. <i>See</i> Straps.	
Canteens:	
To be repaired, etc	633
Two per man issued in dry sections	639
Cans, used for shipping oils, etc., not to be taken up on property papers.....	450
Canvas bags. <i>See</i> Bags.	
Capstans:	
Allowance of, for issue.....	372
List of component parts of.....	372
Cap-square locking pins. <i>See</i> Pins.	
Cap squares, pin securing (spare), 4.72-inch R. F. gun mounts.....	271
Carbine slings. <i>See</i> Slings.	
Carbine swivels. <i>See</i> Swivels.	
Carbines:	
Springfield, caliber .45, issued for use in guarding prisoners.....	594
United States magazine, caliber .30—	
Assembled or complete parts, only issued in this form, etc.....	589
Changes made since adoption of arm	561-564
Cleaning, etc	586
Company commanders to supervise dismounting, etc.....	589
Differences in parts of models.....	589
List of parts interchangeable with United States magazine rifle parts, caliber .30	586
Models—	
1896 to 1898, certain ones can not be fitted with model 1901 sights, etc	586
List of parts not interchangeable.....	584
1896 to 1898, and 1899, component parts of	580
1899, essential differences from model 1896	584
List of parts of, not interchangeable	586
Parts broken not issuable for repairs, arm to be turned in	593
Principal dimensions and weights.....	580-581
To be issued to officers of bands, etc	586
Carpenter's tools. <i>See</i> Tools.	
Carpenter and wheelwright tools. <i>See</i> Tools.	
Carriages:	
Care of, etc., instructions in ordnance publication to be followed, etc.....	674
Colt's automatic gun, caliber .80, component parts of.....	567
For—	
4-inch R. F. gun (Driggs-Schroeder), (mount)	261
7-inch B. L. mortar, differences in first and second models 1896.....	439
10-inch disappearing carriage, model 1896, Nos. 49 to 70, with two bands, etc	107
Gun—	
Chief of Ordnance to be advised of commencement of work of erection	675
Subject to inspection of ordnance officer, during erection, etc.....	675
Issued, to be fully prepared for service, etc	675
Limbers, caissons, etc., for all field guns, if damaged so repairs can not readily be made to be sent to Rock Island Arsenal	500, 502, 503
List of parts, materials, nomenclature, etc.—	
Gatling gun, model 1890.....	500-561
1.457-inch Vickers-Maxim automatic gun (field)	576
1.65-inch mountain gun	583
2.95-inch (75 mm.) Vickers-Maxim mountain gun	544-546
3-inch Hotchkiss mountain gun	541
3.2-inch B. L. rifle	472-473
3.6-inch B. L. rifle	620
3.6-inch B. L. mortar.....	527
5-inch barbette, balance pillar mount, model 1896	227-232
5-inch siege rifle, model 1892.....	402-403
Model 1896 and 1896 M	403-406
6-inch barbette (pedestal mount), model 1900	255
6-inch disappearing carriage, L. F., model 1898	243-251
7-inch B. L. howitzer, model 1896.....	423-425
Model 1896	425-427
7-inch B. L. mortar, model 1896.....	436-437
8-inch barbette, model 1892.....	24-28
8-inch disappearing L. F., model 1894	28-34
Model 1896	35-42
10-inch barbette, model 1898.....	72-78

Carriages—Continued.	Page.
Gatling gun—Continued.	
10-inch disappearing L. F., model 1894	79-85
Model 1896	85-94
10-inch disappearing A. R. F., model 1896	97-106
12-inch barbette, model 1892	145-151
12-inch disappearing, L. F., model 1896	158-159
Model 1897	160-168
Model 1901	169-178
12-inch B. L. mortar, model 1891	207-211
Model 1896	212-214
Model of guns required for 12-inch disappearing	181
Mounting same, who by, etc	674
Number and model of, found on brass plate on main frame, sea coast, and trail of field	676
Number of coats of paint to be applied, etc	676
Parts to be painted	676
Siege artillery, essential differences in construction of, 5-inch and 7-inch	446
Weights of principal parts:	
5-inch barbette, balance pillar mount, model 1896	226
6-inch disappearing, L. F., model 1896	242
8-inch barbette, model 1892	28
8-inch disappearing, L. F., model 1894	28
Model 1896	35
10-inch barbette, model 1896	71
10-inch disappearing, L. F., model 1894	69
Model 1896	85
10-inch disappearing, A. R. F., model 1896	97-98
12-inch barbette, model 1892	144-145
12-inch disappearing, L. F., model 1896	152
Model 1897	159-160
12-inch B. L. mortar, model 1891	206-207
Model 1896	211
Carts:	
Hand, list of component parts, weights, etc	373
Hand aling, list of component parts, etc	374
Sling, large, list of component parts, weights, etc	374-375
Hand, allowance of, for issue	373
Hand-aling, allowance of, for issue	373
Large-aling, allowance of, for issue	373
Cartridge bags, dimensions, etc., for saluting charges, 8, 10, and 12-inch guns	342
Cartridge boxes (McKeever) issued to service, etc	638
Cartridge case extractor. <i>See</i> Extractor.	
Cartridge cases:	
Empty, metallic, to be reloaded at Frankford Arsenal	353
For 4.72-inch and 6-inch R. F. guns (Armstrong), to be taken up after firing as "empty cartridge cases," etc	281
Metallic, empty, to be taken up on property returns	353
Cartridges:	
Caliber .30, reduced range, designed for issue to the service	593
How distinguished	593
Drill, allowance of, and parts of, for—	
6-pounder R. F. guns (also subcaliber tubes)	294
15-pounder R. F. gun (Driggs-Seabury) (also subcaliber tubes)	297
2.95-inch mountain battery	547
4-inch R. F. guns (Driggs-Schroeder)	261
Dummy—	
Allowance of, for—	
Colt's automatic machine gun, caliber .30	570
7-inch B. L. howitzer	431
Siege batteries	413
Caliber .30—	
Allowance of, for issue	590
Description of	590
How distinguished	590
For all caliber of guns (sea coast), description and allowance of	343-344
Light batteries, allowance of, for issue	519
Gallery practice, caliber .30, description of	59

	Page
Cartridges—Continued.	
Multiball, description of, etc.....	60
Multiball, caliber .30, issued for, and allowance for issue.....	60
Rifle and carbine, may be purchased by officers and men for target practice.....	56
Small arms—	
May be purchased by men for hunting, etc.....	59
To be packed in zinc cases, etc., for ocean transportation.....	64
Smokeless powder (sea coast), dimensions of.....	32
Cartridge storage cases:	
Dimensions of, and how crated, etc.....	65
Empty, galvanized, iron, etc., to be shipped to arsenals, etc.....	65
Instructions for painting.....	241-242
Instructions for uncrating.....	241
Kind issued for seacoast posts.....	242
Case, running out spring (spare) 6-inch R. F. mount (Armstrong).....	279
Catch, retaining breech screw open, 4.72-inch guns. <i>See</i> Block latch.	
Cells:	
Dry, not furnished with chronographs.....	217
Edison-Leland "Q" issued with chronographs.....	217
O. K. dry, issued for lighting and firing mechanism, allowance of.....	67
Chains:	
Counterweight (spare), 15-pounder mount, Driggs-Seabury.....	29
Curb, substituted for straps.....	62
Sling, allowance of, per post for issue.....	77
Suspension (spare), 6-inch barbette carriage, balanced pillar mount, model 1896.....	22
Chalk, issued for seacoast posts, allowance of.....	22
Chambers, powder, dimensions of, 6-inch R. F. gun, O. D., Nos. 1 to 14.....	22
Charges, high explosive, weight of.....	22
Charts:	
Difference, not issued by Ordnance Department.....	219
Set back, not issued by Ordnance Department.....	219
Chests. <i>See</i> Ammunition chests.	
Chronographs:	
Difference between French and American make.....	57
List of parts, etc.....	216-217
Not regularly issued, etc.....	21
Chronometers, component parts of circuit for same.....	217
Cinchas, proportion in which supplied to—	
Cavalry.....	63
Field batteries.....	24
Circuit breaker:	
Complete—	
6-inch R. F. gun, O. D., model 1897.....	25
6-inch R. F. gun, O. D., models 1897, 1897 M1, and 1900.....	25
12-inch B. L. mortar, model 1896.....	19
Model 1896-1890 M1.....	19
Model 1890 (steel).....	19
Model 1890 M1.....	26
Contact pin (spare)—	
6-inch R. F. gun, O. D., model 1897.....	25
6-inch R. F. guns, models 1897-1897 M1.....	24
Model 1900.....	26
Clamps, sight (spare), 6-inch disappearing carriage, L. F., model 1896.....	25
Cleaning brush. <i>See</i> Brush.	
Cleaning material (see Material) for depression range finders, allowance of, etc.....	26
Cleaning and preservation material. <i>See</i> Material.	
Clock oil, to be used for depression range finders, allowance of.....	27
Cloth, cotton:	
Expendable.....	61
For targets, issued by the yard, etc.....	61
Coal oil. <i>See</i> Oil.	
Coatings for greaser (spare):	
4.72-inch R. F. gun (Armstrong).....	27
6-inch R. F. gun (Armstrong).....	27
Collar:	
Extractor for United States magazine rifle, caliber .30, model 1908, not to be removed, except, etc.....	28

	Page.
Collars, horse:	
Requisitions for top connections. <i>See</i> Requisitions.	
Steel—	
Component parts of.....	515
Dimensions of, etc.....	515
Instructions as to adjustment, etc.....	516
Pad. <i>See</i> Pads.	
Colleges, regulations governing issue to, etc.....	621-624
Combined tomplons and muzzle covers. <i>See</i> Tomplons, etc.	
Companies changing stations to take property with them, etc.....	679
Composition of:	
1.65-inch mountain battery.....	594
2.96-inch (75 mm.) mountain battery.....	549
3-inch Hotchkiss mountain battery.....	542
3.2-inch field battery.....	457
3.6-inch B. L. rifle battery.....	590
3.6-inch mortar battery, not determined.....	528
7-inch B. L. howitzer battery.....	414
7-inch B. L. mortar battery, not determined.....	482
Gatling gun battery.....	557
Competition prices. <i>See</i> Prices.	
Conductors, electrical, for disappearing carriages.....	220
Cord, ash:	
For pulley blocks for 3.2-inch battery, allowance of, etc.....	508
Requisition for. <i>See</i> Requisition.	
Correction tables. <i>See</i> Tables.	
Correspondence:	
Relative to ordnance material to be forwarded through artillery district headquarters.....	367
Replies should always refer to ordnance office numbers, etc.....	563
Cotterpin. <i>See</i> Pins.	
Counterweight chains. <i>See</i> Chains.	
Covers:	
Front sight and muzzle, for caliber .30 arm, allowance of, for issue, etc.....	558
Pivot hole (spare) 4-inch recoil mount (Driggs-Schroeder).....	261
Breech, for United States magazine rifles and carbines, allowance of, for issue, etc.....	558
For Lewis type "A" instruments, issued.....	302
Front sight, supplied for caliber .30 carbines.....	558
Spring—	
Large, for oil hole (spare) 6-inch barbette carriage, model 1900, pedestal mount.....	256
Small, for oil holes (spare) 6-inch barbette carriage, model 1900, pedestal mount.....	256
Crane ropes. <i>See</i> Ropes.	
Cross hairs, position-finders and azimuth instruments, platinum wire substituted for spider lines, if desired, etc.....	316
Crosshead-pawl stops. <i>See</i> Stops.	
Crusher gauges:	
Allowance of, for issue.....	371
Consolidated, list of tools, accessories, etc., as issued.....	371-372
Copper covered, for cannon—	
Description, list of parts, etc.....	371
Tools for, etc.....	371
Fixed (large)—	
Component parts of.....	370
Tools issued with same.....	370
Fixed (small)—	
Component parts of.....	371
Tools for same.....	371
Internal (loose) for guns 3-inch caliber and larger—	
Component parts of.....	371
Tools for.....	371
Internal (small) for guns under 3-inch caliber—	
Component parts of, etc.....	371
Tools for.....	371
Kinds issued to the service, etc.....	370
Curb bits. <i>See</i> Bits.	
Cup gas checks for crusher gauges, number issued.....	372

	Page.
Cup leathers, piston rod (spare):	271
4.72-inch R. F. gun mounts	273
6-inch R. F. mount (Armstrong)	359
Cylinders, capacity of, service carriages	372
Cylinder holders for crusher gauges, number issued	372

D.

Decapping and cleaning tools. *See* Tools.Decapping tools (*see* Tools).Deflector handle. *See* Handle.**Depression position finders:**

Lewis—	
Adopted, etc	301
Type "A"—	
Allowance of, etc	301
List of parts of	304
Used for elevations of 60 feet and above	301
Type "B" (emergency)—	
Allowance of	301
Issue suspended except as azimuth reading instruments	301
List of parts	306
Types "A" and "B"—	
Instructions for making requisitions for	302
Special packing boxes for	302
To be packed in special packing boxes only	302
Tools, components of sets of	307
Lewis and Rafferty:	
Spare parts for illuminating device not issued, except, etc	314
Type "B," bases for same, allowance of	302
Platinum wires substituted for spider lines, if desired, etc	316
Polishing material not to be used on instruments	307
Prisms, erecting for instruments to be supplied with locking nuts, etc	316
Repairs to be directed by Ordnance Department	307
Rafferty, type "B"—	
Allowance of	301
Instructions for making requisition for	302
Issue suspended except as azimuth reading instruments	301
List of parts, etc	306-309
Swasey, type "A"—	
Adopted as service type, allowance of, etc	311
Care of, etc	314
Description of	313
Instructions for removing eyepiece, etc	314
Leather cap for object glass, etc	314
List of parts of	311
Not provided with resistance units, etc., to reduce voltage	314
Oil for use with, and instructions relative thereto	314
Principal points of	312
Spare parts for illuminating device not issued, except, etc	314
Tools for	314
Derricks issued for mounting heavy ordnance	377
Diagonal tangent scales. <i>See</i> Scales.	
Difference charts. <i>See</i> Charts.	
Differences:	
Essential—	
In construction of siege-artillery carriages	444-446
List of, between models 1898 and 1898 M, Driggs-Seabury 6-pounder mounts	292
In first and second model 1896 7-inch B. L. mortar carriages	439
Principal—	
Between models of siege-artillery guns	441-443
In models of field guns	466-469
Dimensions, principal:	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder), Mark II	286
Mark III	287
6-pounder R. F. gun, Driggs-Seabury, model 1898	288
Model 1900	284
15-pounder R. F. gun, Driggs-Seabury	296

Dimensions, principal—Continued.

	Page.
1.65-inch Hotchkiss mountain gun.....	530
2.95-inch (75 mm.) Vickers-Maxim mountain gun.....	543
3-inch Hotchkiss mountain gun.....	539
3.2-inch B. L. rifle, model 1885.....	457
Model 1897.....	460
3.6-inch B. L. rifle, model 1891.....	521
3.6-inch B. L. mortar, model 1890.....	522
4-inch R. F. gun (Driggs-Schroeder).....	259
4.72-inch R. F. gun (Armstrong)—	
40 calibers.....	263
45 calibers.....	264
50 calibers.....	265
5-inch B. L. rifle, siege, model 1890.....	393
Model 1898.....	396
5-inch R. F. gun, Ordnance Department, model 1897.....	221
6-inch R. F. gun (Armstrong).....	272
6-inch R. F. guns, models 1897 and 1897 M1.....	225
6-inch R. F. gun, O. D., model 1900.....	226
7-inch B. L. howitzer, model 1890.....	414
Model 1898.....	413
8-inch B. L. rifle, model 1888.....	10
Model 1888 M1.....	15
Model 1888 M11.....	20
10-inch B. L. rifle, model 1888.....	51
Model 1888 M1.....	55
Model 1888 M11.....	60
Model 1896.....	53-64
Model 1896 M1.....	67
12-inch B. L. rifle, model 1888.....	119
Model 1888 M1.....	124
Model 1888 M11.....	129
Model 1888 M11.....	134
Model 1896.....	137
Model 1896 M1.....	140
12-inch B. L. mortar, model 1886, cast iron, steel hooped.....	188
Model 1886-1890 M1.....	196
Model 1890 (steel).....	193
Model 1890 M1 (steel).....	208

Disks:

For—	
Gallery target, issued, etc.....	616
Marking rods, not expendable.....	616
Friction (spare), 4-inch recoil mount (Driggs-Schroeder).....	251
Dispatch cases, made and sold to officers.....	638
District armament officers provided for.....	367
Dollies, issued with maneuvering material, allowance of.....	363
Door mats, not supplied by Ordnance Department.....	676
Doubletrees, all 3.2-inch vehicles interchangeable.....	517
Dowels, elevation pointer (spare):	
8-inch disappearing carriages.....	42
10-inch disappearing carriages.....	106
12-inch disappearing carriages.....	179
Drawing instruments. <i>See</i> Instruments.	
Drawing material. <i>See</i> Materials.	
Drill cartridges. <i>See</i> Cartridges.	
Drill primer outfit, description of list of parts, etc.....	353-354
Dudgen hydraulic jacks. <i>See</i> Jacks.	
Dustpans, not supplied by Ordnance Department.....	676

E.

Electrical attachments, night sights, 5-inch R. F. gun, model 1897.....	231-232
Electrical conductors. <i>See</i> Conductors.	
Electrical outfit (spare), 15-pounder mount (Driggs-Seabury).....	299
Electric firing attachments. <i>See</i> Firing attachments.	
Electric firing cable. <i>See</i> Cable.	
Electric lamp for illuminating device for Swasey type "A," position finder, of special design....	314

	Page.
Electric-light fittings for sights, 4.72-inch R. F. guns (Armstrong)	289
Elevating device (Lazy tong), list of parts of, 8.2-inch carriage	476
Elevating devices for 8.6-inch B. L. rifles, three in use, etc	520
Elevating pointer top bolt. <i>See</i> Bolt.	
Elevating stops. <i>See</i> Stops.	
Elevating worm thrust. <i>See</i> Thrust.	
Elevation pointer dowels. <i>See</i> Dowels.	
Elevation pointer screws. <i>See</i> Screws.	
Elevation scale screws. <i>See</i> Screws.	
Employees, civilian, of War Department may be armed, etc	604
Energy. <i>See</i> Muzzle energy.	
Engines, oil, list of principal parts of, etc (submarine mine material)	386
Engine supplies. <i>See</i> Supplies.	
Engineer transits. <i>See</i> Transits.	
Expanding tompon. <i>See</i> Tompon.	
Expendable material	660
Expendable stores. <i>See</i> Stores.	
Experimental ordnance stores, disposition of	672
Equalizing and pipe throttling device, complete (spare):	
For—	
6-inch disappearing carriage, L. F., model 1898, issued to district armament officers	256
8-inch carriages	42
8-inch disappearing carriages, issued to district armament officers not to posts	43
10-inch carriages	106
10-inch carriages, issued to district armament officers not to posts	108
12-inch carriages, issued to district armament officers not to posts	180
12-inch carriages	180
12-inch B. L. mortar carriages	216
12-inch B. L. mortar carriages, issued to district armament officers not to posts	216
Equipments:	
Brass parts supplied for repairs	683
Can not be sold to retired officers	679
Cavalry, black leather—	
Not to be condemned, etc	632-633
When they may be exchanged	633
Cavalry, russet leather—	
Adopted	632
Component parts of, for 2.06-inch Vickers-Maxim guns, etc	354
For 8.6-inch B. L. rifle battery	500
Furnished with—	
Garrison gun, complete	377
12-inch B. L. mortars	356
Horse—	
Dimensions of leather parts	640-642
Extra, to be retained in troop, etc	633
For siege batteries	451
May be purchased by officers, but not to be disposed of	636
Not issued to officers on temporary mounted duty, except ordnance officers, etc	679
Sold to infantry officers	636
Surplus to be turned in, etc	638
Incorrectly marked, etc., to be continued in service	633
Individual, for—	
Coast Artillery troops	626
Engineer troops	626
Hospital Corps men	626
Ordnance detachments	626
Signal Corps men	626
Individual, horse, for light artillery soldier	615
Individual, list of, for—	
Cavalry soldiers, noncommissioned staff officer, and member of band	628
Infantry noncommissioned staff soldier	625
Infantry soldier	625
Member infantry band	626
Personnel for siege battery	452-453-454
Personnel of light battery	513-520
Of men of—	
Mountain battery	656
1.45-inch Vickers-Maxim mountain gun	678

Equipments—Continued.

	Page.
Leather parts supplied for repairs	633
List of, for—	
Light 12-pounder gun	653
1.457-inch Vickers-Maxim mountain guns and carriages, 4689 to 4690	576-577
Above 4690	577-578
2.95-inch mountain gun and carriage, Vickers-Maxim	547-548
3-inch muzzle-loading rifle	653-654
List of, furnished for seacoast B. L. guns	356
Mess, etc., may be sold to civilian employees, etc	594
Of—	
3-inch Hotchkiss mountain gun battery	542
3.6-inch B. L. mortar battery, how transported	529
Officers—	
Purchaser to pay express charges	638
Horse, etc.—	
List of, for sale to officers	636-637-638
Officer may take from those for which accountable and deposit funds, etc	636
To be obtained from Rock Island Arsenal, etc	636
Personal—	
Component parts of	638-640
Rumel leather, to be frequently cleaned, etc	631
Seacoast, when not repairable at post to be sent to power machine shop	367
Siege battery, list of, to be carried on implement wagon	410
Equipments and implements, 3.6-inch B. L. mortar. <i>See</i> implements.	
Equipments and tools, list of, for:	
5-inch B. L. rifle, siege, and carriage	412
7-inch B. L. howitzer and carriage	430
Equipments, tools, and implements, list of, for 3.2-inch field battery	505-508
Etching outfit:	
Adopted, component parts of, and allowance for issue	636
Description and instructions for its use	636
Extensible sight, for Gatling gun. <i>See</i> Sights.	
Extractor:	
Cartridge case (spare)—	
4.72-inch R. F. guns (Armstrong)	270
6-inch R. F. guns (Armstrong)	273
Collar. <i>See</i> Collar.	
Complete—	
4.72-inch R. F. guns (Armstrong)	268-269
6-inch R. F. gun (Armstrong)	276
Dog, pivot split pin. <i>See</i> Split pin, etc.	
For cylinder heads (spare)—	
6-inch disappearing carriage, L. F., model 1898	255
8-inch disappearing carriage	42
10-inch disappearing carriages	108
12-inch disappearing carriages	180
For stuffing boxes (spare)—	
8-inch barbette carriage	42
10-inch barbette carriage	108
12-inch barbette carriages	180
Right and left, spare—	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder), Mark II	286
Mark III	288
4-inch R. F. gun (Driggs-Schroeder)	280
Spare—	
6-pounder R. F. gun, Driggs-Schroeder, model 1900	285
4.72-inch R. F. guns (Armstrong)	270
8-inch R. F. gun, O. D., model 1897	225
6-inch R. F. gun (Armstrong)	278
6-inch R. F. guns, models 1897 and 1897 M1	240
6-inch R. F. gun, O. D., model 1900	241
Spring. <i>See</i> Spring.	

F.

Faucets, issue of, discontinued as separate items	358
---	-----

	Page
Fencing equipments:	
List and allowance of, for issue to—	
Cavalry troops	63
Infantry troops	63
Not expendable	63-65
To be renewed as needed	65
Field cases, for shotguns, not issued	518
Field material, to be painted khaki colored	62
Files, not issued to cavalry	
Filling and drain plugs. <i>See</i> Plugs.	
Filling funnel. <i>See</i> Funnel.	
Filling plugs. <i>See</i> Plugs, filling.	
Fire control, temporary system of	302
Fire control and direction, adopted, permanent system, equipment of stations, etc	302-304
Firing attachments:	
Complete—	
List of parts of—	
5-inch B. L. rifle, siege, model 1896-1898 M1	285
5-inch R. F. gun, O. D., model 1897	225
6-inch R. F. gun, O. D., models 1897-1897 M1, and 1900	238
6-inch R. F. gun, model 1897 and 1897 M1	240
7-inch B. L. howitzer, model 1898	419
8-inch B. L. rifle, model 1898	7
Model 1898 M1	12
Model 1898 M11	17
10-inch B. L. rifle, model 1898	47
Model 1898 M1	52
Model 1898 M11	57
Model 1898	6
Model 1898 M1	65
12-inch B. L. rifle, model 1898	115
Model 1898 M1	129
Model 1898 M11	125
Model 1898 M11	130
Model 1898	135
Model 1898 M1	139
12-inch B. L. mortar, model 1896	186
Model 1896-1899 M1	196
Model 1899 (steel)	191
Model 1899 M1 (steel)	201
Spare—	
5-inch R. F. gun, model 1897	225
6-inch R. F. gun, O. D., model 1900	241
8-inch B. L. rifles	21
10-inch B. L. rifle, model 1898	69
Model 1898	70
12-inch B. L. rifles, model 1898	142
Model 1898	143
12-inch B. L. mortars	205
Electric, for disappearing carriages, description and instructions for use	219-220
Electrical (spare), 6-inch disappearing carriage, model 1898	255
Firing batteries, electric:	
For 8-inch, 10-inch, and 12-inch rifle, to be supplied later, etc	675
Issued to 12-inch mortars and R. F. guns only, at this time	675
Firing cable supports. <i>See</i> Supports.	
Firing gear, electrical, list of parts, material, etc., 6-inch disappearing carriage, L. F., model 1898	250-251
Firing leaf (spare):	
5-inch R. F. gun, O. D., model 1897	225
6-inch R. F. guns, model 1897 and 1897 M1	240
6-inch R. F. gun, O. D. model 1900	241
Firing leaf spring. <i>See</i> Spring.	
Firing leaf spring (spare) 6-inch R. F. gun, 1897 and 1897 M1	240
Firing machine (Lafin & Rand), no longer issued, O. K. cells instead	675
Firing mechanism, complete (spare):	
6-pounder R. F. gun, Driggs-Seabury, model 1898	284
1.65-inch Hotchkiss mountain gun, changed to percussion firing	531
6-inch R. F. gun, O. D., model 1900, essential differences from mechanism of other models, etc.	239

	Page.
Firing pins:	
Complete—	
4.72-inch R. F. guns (Armstrong)	268
6-inch R. F. gun (Armstrong)	276
Complete (spare)—	
4.72-inch R. F. guns (Armstrong)	270
6-inch R. F. guns (Armstrong)	278
Spare—	
6-pounder R. F. gun, Driggs-Seabury, model 1898	284
Model 1900	285
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder) Mark II	286
Mark III	288
15-pounder R. F. gun, Driggs-Seabury	297
4-inch R. F. guns (Driggs-Schroeder)	290
4.72-inch R. F. guns (Armstrong)	270
6-inch R. F. gun (Armstrong)	278
Firing-pin heads (spare):	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder), Mark II	286
6-pounder R. F. gun, Driggs-Seabury, model 1900	285
Firing-pin points (spare), 4-inch R. F. gun (Driggs-Schroeder)	290
Firing-pin springs. <i>See</i> Springs.	
Floating targets. <i>See</i> Targets.	
Flour, for paste for targets, issued by Commissary Department	617
Forge and battery wagons. <i>See</i> Wagon.	
Forge, portable:	
All articles to maintain, furnished by Ordnance Department	652
Complete, component of	652
Issued to cavalry, allowance of	652
Forgings:	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder) Mark II	286
Mark III	288
6-pounder R. F. gun, Driggs-Seabury, model 1898	288
Model 1900	285
Friction disks. <i>See</i> Disks.	
Front exterior split ring (all guns). <i>See</i> Split ring, front.	
Funnel:	
Filling (spare), 5-inch barbette carriage, balanced pillar mount, model 1898	222
Issue of, separately discontinued	358
Fuses:	
Dummy combination for instruction purposes, allowance of	351
Punch	351
Punch pins, issued with punch	351
Tools, component of set for siege batteries	351
Wrenches, for siege and seacoast shells	351
A C and W, high and low resistance (latest)	350
Colored plates of, for instruction purposes	350
Component parts of standard fuses	345-346-347
Detonating	350
High resistance, issued, fixed in shell	347
How handled to prevent premature explosion	351
Improper condition suspected, to be shipped to Frankford Arsenal	351
Latest standard—	
Device to cause action in side impact, etc	350
List and description of	348
And nomenclature of parts	348-349-350
List of, for—	
1.45-inch Vickers-Maxim mountain gun	574
1.65-inch (Hotchkiss)	532
6-pounder R. F. guns	295
2.95-inch (75 mm.) Vickers-Maxim mountain gun	547
3-inch Hotchkiss mountain gun	540
15-pounder R. F. gun, Driggs-Seabury	296
3.2-inch B. L. rifle	464
3.6-inch B. L. mortars	626
4-inch R. F. gun (Driggs-Schroeder)	280
4.72-inch R. F. guns (Armstrong)	269
5-inch B. L. rifle, siege	401

	Page.
Fuses—Continued.	
List of, for—Continued.	
6-inch R. F. guns, O. D	225
6-inch R. F. guns, O. D	240
6-inch R. F. guns (Armstrong)	277
7-inch B. L. howitzers	422
7-inch B. L. mortars	435
8-inch B. L. rifle	21
10-inch B. L. rifles	68
12-inch B. L. rifles	142
12-inch mortar	204
List of standard fuses, model 1900, description, etc., Ordnance Department	345
Low resistance, how to apply	347
Transported separately	347
Model 1900, manufacture to be discontinued	347
Not to be dismantled for inspection and examination	351
Not to be stored in powder magazines	358
Primers for 7 M, etc	359
Sectional for instruction purposes, allowance of, etc	359
Time, action of, and instructions for use	347
To take place of model 1900, list and description of	343
G.	
Garrison Gins. <i>See</i> Gins.	
Gas-check pads:	
Instructions for regulation of	909
Spare—	
5-inch R. F. gun, O. D., model 1897	225
6-inch R. F. guns, model 1897 and 1897 M1	240
6-inch R. F. gun, O. D., model 1900	241
8-inch B. L. rifles	21
10-inch B. L. rifles, model 1888	68
Model 1895	68
12-inch B. L. rifles, model 1888	142
Model 1895	143
12-inch B. L. mortar	205
Gaskets:	
Copper, to be replaced by vulcanized fiber	675
Large (spare)—	
6-inch disappearing carriage, L. F., model 1898	255
8-inch disappearing and barbette carriages	42
10-inch disappearing and barbette carriages	107
12-inch carriages	179
12-inch B. L. mortar carriages	215
Leather, to be replaced by vulcanized fiber	675
Small (spare)—	
6-inch disappearing carriage, L. F., model 1898	255
8-inch disappearing and barbette carriages	42
10-inch disappearing and barbette carriages	107
12-inch disappearing and barbette carriages	179
12-inch B. L. mortar carriages	215
Spare—	
4-inch recoil mount, Driggs-Schroeder	261
6-inch barbette carriage, model 1900, pedestal mount	256
Vulcanized fiber, to take place of copper and leather, etc	675
Garlocks, packing. <i>See</i> Packing.	
Gatling gun:	
Caliber .30—	
Component parts of	557-559
Model 1903—	
Nomenclature of parts, etc	560
To use latest ammunition, 2,300 foot-seconds velocity	560
To be provided with extensible sights	560
To whom issued	557
Caliber .45, no longer issued to the service	557
Composition of battery of	557
Gauge, for use in repair of revolvers, to be supplied to ordnance depots	802
Gauges, pressure, issued for use with 6-inch R. F. guns, O. D	240

Gins:	Page.
Garrison—	
Allowance of, for issue.....	375
Equipments furnished with	377
List of component parts of.....	376
Piper—	
Allowance of, for issue.....	375
List of component parts of.....	377
Girths, made self-adjusting.....	629
Gland, piston rod:	
Inner (spare)—	
4.72-inch R. F. mount.....	271
6-inch R. F. mount (Armstrong)	279
Outer (spare)—	
4.72-inch R. F. gun mount.....	271
6-inch R. F. mount (Armstrong)	279
Glasses:	
Hand magnifying, allowance of.....	321
Saw—	
Kind and allowance for issue to posts and troops	679
Not to be condemned, etc	679
Gun:	
Commanders range scale. <i>See</i> Scales.	
Range scale boxes (<i>see</i> Boxes).....	320
Guns:	
8-inch muzzle loading (reveille), list of equipments for.....	658-664
Light 12-pounder (reveille) list of equipments for.....	663
8.2-inch field, where number and model of gun is stamped.....	676
Care of, etc., instructions in Ordnance Department publications to be followed, etc	674
Field, principal differences in models.....	466-469
Issued to be fully prepared for service.....	675
Model of, marked on face of muzzle since 1894, prior on right trunnion.....	676
Model 1888, all calibers, requiring long sight brackets, must have additional holes drilled, etc.	676
Mounting same, who by, etc	674
Number of, stamped on face of muzzle	676
Reveille, kind issued, etc.....	658
Gunners' badges. <i>See</i> Badges.	
Guide bolts. <i>See</i> Bolt.	
H.	
H and H cleaning material issued to clean cartridge belts, allowance of	633
Halyards, go with streamers, also issued separately, etc.....	615
Halter chains issued for use at posts, etc	629
Halter straps, expendable, in repairs, etc.....	636
Halters for mules not supplied by Ordnance Department.....	451
Hand:	
Cart. <i>See</i> Cart.	
Guards, with sight-protecting shoulder, for carbine, etc., to be provided, etc.....	633
Locking lever. <i>See</i> Operating lever.	
Magnifying glasses. <i>See</i> Glasses.	
Sling carts. <i>See</i> Carts.	
Handless:	
Clamp, oscillating slide (spare), 6-pounder Driggs-Seabury mounts	292
Deflector (spare), 6-pounder Driggs-Seabury mounts.....	292
For ammunition trucks (spare)—	
8-inch disappearing carriage.....	42
16-inch disappearing carriage.....	106
12-inch carriages.....	180
Handwheel elevating gear (spare)—	
4.72-inch R. F. gun mount.....	271
6-inch R. F. mount (Armstrong).....	279
Handwheel training gear (spare)—	
4.72-inch R. F. gun mount.....	271
6-inch R. F. mount (Armstrong)	279
Shot truck (spare), 6-inch disappearing carriage, L. F., model 1898	266
Shoulder bar (spare) 16-pounder mount, Driggs-Seabury.....	299
Slide (spare), 6-inch R. F. gun, model 1897 and 1897 M1.....	240

	Page.
Handspikes:	
Maneuvering, allowance of for issue to seacoast posts.....	284
Roller, allowance of, for issue to seacoast posts.....	284
Trail, 3.2-inch carriage, considered part of carriage.....	500
Handwheel:	
For elevating gear, complete (spare)—	
4.72-inch R. F. gun mounts.....	271
6-inch R. F. mount (Armstrong).....	279
For training gear, complete (spare)—	
4.72-inch R. F. gun mount.....	271
6-inch R. F. mount (Armstrong).....	279
Handle. <i>See</i> Handle.	
Harness:	512-514
Artillery, list of component parts.....	
For—	
Artillery store wagon, regulation artillery harness issued, etc.....	514
Gatling gun batteries.....	565
1.457-inch Vickers-Maxim mountain gun battery.....	572
7-inch B. L. howitzer battery (<i>see</i> 5-inch B. L. R. siege battery).....	432
Siege batteries.....	413
How boxed when issued.....	514
Mule—	
For 7-inch howitzer battery, is regularly issued by Quartermaster's Department.....	414
For siege trains, regulation of Quartermaster's Department.....	398
Not issued by Ordnance Department.....	451
Racks, only issued upon special requisition, not part of equipment of field battery.....	514
Haversack straps. <i>See</i> Straps.	
Haversacks, to be washed and repaired, etc.....	62
High-explosive charges, weight of, adopted for various projectiles.....	226
Hinge-pin oil-hole screws (spare). <i>See</i> Screws.	
Hold-fasts, allowance of, for issue to posts, etc.....	373
Hook for extracting cartridge case. <i>See</i> Extractor cartridge case.	
Hooks:	
Snap—	
Requisition for, how to be made.....	679
Should state kind required, etc.....	513
Twisted, for holding firing cable (spare), 6-inch disappearing carriage, L. F., model 1898....	254
Horse:	
Collars. <i>See</i> Collars.	
Covers, for field batteries, issued only when specially called for, etc.....	514
Equipments. <i>See</i> Equipments.	
Hose, rubber, supplied, etc.....	362
Housings, for general officers' saddles, made to order, etc.....	626
Howitzers, B. L.:	
7-inch, composition of battery of.....	414
7-inch siege, principal differences between models.....	441-445
List of parts, nomenclature, etc.—	
7-inch, model 1890.....	415
Model 1898.....	418
Hydrolene oil (<i>see</i> Oil), allowance of, to be drawn only when needed, etc.....	360
I.	
Illuminating device for—	
Depression position finder—	
Lewis, type "A"—	
Description of, and instructions for care of, etc.....	311
List of parts of, etc.....	309-310
Lewis and Rafferty, type "B," list of parts of, etc.....	310
Warner and Swasey azimuth instruments.....	315
Illumination of scales and pointers of disappearing carriages.....	220
Implement chests, contents of, for—	
5-inch barbette carriage, B. P. M., model 1896.....	233
6-inch disappearing carriage, L. F., model 1898.....	257
8-inch barbette carriage, model 1892.....	41
8-inch disappearing carriage, L. F., model 1894.....	44
Model 1896.....	45
10-inch barbette carriage, model 1898.....	110

Implement chests, contents of, for—Continued.	Page.
10-inch disappearing carriage, L. F., model 1894.....	110
Model 1896.....	110
10-inch disappearing carriage, A. R. F., model 1896.....	110
12-inch barbette carriage, model 1892.....	182
12-inch disappearing carriage, L. F., model 1896.....	186
Model 1897.....	183
12-inch gun-lift carriage, model 1891, and altered gun-lift carriage, model 1894.....	182
For seacoast guns, sizes of.....	652
With tools, how accounted for.....	678
Implements:	
Furnished with 12-inch B. L. mortars.....	358
List of, furnished for seacoast B. L. guns.....	357
Implements, equipments, etc., not on supply tables 3.2-inch, battery, issued only as needed, unserviceable to be inspected, etc.....	512
Implements and equipments:	
Furnished with 3-inch Hotchkiss mountain guns and carriages.....	541
List of, issued with 3.6-inch B. L. mortar.....	529
Implements and tools:	
Earlier model carriages to be taken up on property returns.....	678
Issued with each Gatling gun, calibre .30.....	550
List of, for—	
3.2-inch field battery.....	505-508
Forge and battery wagon, siege battery.....	451
Requisition for, how to be made.....	678
Implement wagon. <i>See</i> Wagon.	
Inks:	
Burnishing, not issued.....	632
For use with sine plotting boards, composition of.....	313
Indelible—	
Issued for marking equipments.....	679
Not issued for marking clothing.....	679
Instructions for—	
Adjusting safety lanyard attachments for 4.73-inch R. F. (Armstrong) firing mechanism....	670
Ascertaining strain rope will bear.....	382
Making requisition for—	
Hydraulic jacks.....	370
Lewis and Rafferty range finders.....	302
Repairs to armament by district armament officers.....	367
Tompson and muzzle covers, breech covers, and sponge covers.....	368
Spare parts for—	
3-inch B. L. rifle and carriages.....	43
10-inch B. L. rifle and carriages.....	108
12-inch guns and carriages.....	180
12-inch B. L. mortars and carriages.....	216
Ordering spare parts for 5-inch B. L. rifles, siege.....	400
Packing stuffing boxes of hydraulic cylinders seacoast carriages.....	671
Painting carriages, etc.....	351
Pulling obturating friction primers.....	352
Regulating oil in cylinders seacoast carriages for reduced charges.....	671-672
Relative to making repairs of field batteries and furnishing ordnance stores and supplies..	673-674
Removing old paint from guns, etc.....	670
Use of electric firing attachments on disappearing carriages.....	219-220
Using and adjusting safety lanyard attachments on disappearing carriages.....	218-219
Instruments:	
Drawing, allowance of, etc.....	820-821
For—	
Observation of fire, not regularly issued, no definite type adopted, etc.....	316
Obtaining wind components, not issued by Ordnance Department.....	316
Miscellaneous, list of, for siege batteries.....	448
Issues and sales, regulations pertaining thereto.....	658-659
Insulating washers. <i>See</i> Washers.	
Insulation:	
Circuit-breaker contact pin (spare)—	
5-inch B. F. gun, O. D., model 1897.....	225
6-inch B. F. gun, models 1897 and 1897 M1.....	240
Side contact bracket (spare), 6-inch R. F. gun, O. D., model 1900.....	241

	Page
Insulation—Continued.	
Side contact plate (spare)—	
5-inch R. F. gun, model 1897.....	235
6-inch R. F. gun, models 1897 and 1897 M1.....	240
Slide contact pin—	
5-inch R. F. gun, O. D., model 1897.....	235
6-inch R. F. gun, models 1897 and 1897 M1.....	240
Slide contact rod (spare), 6-inch R. F. gun, model 1900.....	241
Interior split ring. <i>See</i> Split ring, small.	
Intrenching knives, obsolete, not issued.....	554
J.	
Jackscrews not issued to posts.....	676
Jacks:	
Dudgeon hydraulic:	
Instructions for making requisition for parts.....	370
List of parts.....	372
K.	
Keep pins for—	
Axis of bolt actuating extractor. <i>See</i> Split pin, extractor dog pivot.	
Carrier hinge bolt. <i>See</i> Split pins for hinge pins.	
Link actuating breech screw. <i>See</i> Split pins, operating link.	
Nut of hand lever. <i>See</i> Split pins, operating lever.	
Keys:	
Recoil sleeve (spare), 15-pounder mount, Driggs-Seabury.....	239
Spindle, 6-inch R. F. gun, O. D., model 1900, acts merely as a stop, etc.....	239
Valve (spare), 6-inch R. F. mount (Armstrong).....	239
For elevating shafts (spare), 4-inch recoil mount (Driggs-Schroeder).....	241
Spare 6-inch disappearing carriage, L. F., model 1896.....	255
Taper (spare)—	
6-inch disappearing and barbette carriages.....	11
12-inch carriages.....	15
L.	
Lanterns:	
Brass, "Cranstan attachment," issue suspended.....	462
"Cranstan," issue to field batteries discontinued.....	467
Railroad—	
Issued to field batteries.....	517
Regulation lamp issued.....	45
Lanyard attachment, safety:	
Principal parts of, for 6-inch R. F. guns, O. D.....	239
Provided for each 6-inch R. F. gun, O. D.....	239
Lanyard, safety attachment. <i>See</i> Safety lanyard attachment.	
Lanyards, issued with model 1901 Colt's revolvers.....	607
Leather, russet, allowance of, for issue to field batteries equipped with black leather.....	517
Leathers, cup, piston rod (spare), 6-inch R. F. mount (Armstrong).....	277
Leave, rear sight, United States magazine rifle, caliber .30, model 1903, not to be removed from base except.....	569
Leggings (Puttee), made and sold to officers.....	523
Lever, ratchet, complete (spare), 15-pounder mount, Driggs-Seabury.....	239
Levers, lifting ratchet (spare), 6-inch barbette carriage, balanced pillar mount, model 1896.....	222
Lifting pinion cover top bolts. <i>See</i> Bolts.	
Lighting cable. <i>See</i> Cable.	
Limber:	
Component parts of, for—	
Gatling gun carriage.....	561-562
1.45-inch Vickers-Maxim mountain gun carriage.....	575-576
3.2-inch field gun carriage.....	476-481
3.6-inch B. L. rifle.....	520
7-inch B. L. howitzer, same as for 5-inch B. L. rifle, siege.....	472
Siege.....	465
Linchpin fastener (spare), 6-pounder Driggs-Seabury mounts.....	292
Linchpins (spare), 6-pounder Driggs-Seabury mounts.....	291
Link, cavalry, modified, etc.....	629
Lithite paint. <i>See</i> Paint.	
Loading trays. <i>See</i> Trays.	

	Page.
Loading tray, complete, 6-inch R. F. gun (Armstrong)	276
Lock bolt (spare), 15-pounder R. F. gun, Driggs-Seabury	297
Lock bolt spring (spare), 15-pounder R. F. gun, Driggs-Seabury	297
Lock bolt spring screw (spare), 15-pounder R. F. gun, Driggs-Seabury	297
Locking apparatus, Texas target, component parts of	612
Locking bolt, complete, 3.6-inch B. L. mortar, model 1890	525
Locking pins. <i>See</i> Pins.	
Locking springs. <i>See</i> Spring.	
Locks, Yale (spare):	
6-inch disappearing carriage, L. F., model 1898	255
8-inch carriages	43
10-inch carriages	108
12-inch carriages	180
Lumber, for skidding or shelves in ammunition room not supplied by Ordnance Department ..	576
M.	
Machine shops, power:	
For seacoast fortifications	364
List of equipments for, etc	365
Machines and tools, for seacoast fortifications	364
Maneuvering handspikes. <i>See</i> Handspikes.	
Gun. <i>See</i> Handspikes.	
Maneuvering material, seacoast posts, list of	362
Manila rope. <i>See</i> Rope.	
Marking outfits:	
Components of, and allowance for issue to infantry cavalry, etc	635
For—	
Light battery	520
Seacoast posts	369
Siege batteries	455
Marking rods. <i>See</i> Rods.	
Marksmen's insignia:	
Accounted for by inspectors of small-arms practice	634
Become property of marksman, etc	634
Duplicates will be sold, etc	634
List of issued	634
Martingales, not included in officers' horse equipments, made especially, etc	638
Material:	
Cleaning and preservation, list and allowance of, for—	
Colt's automatic gun, caliber .30	570
1.457-inch Vickers-Maxim mountain gun battery	578
2.95-inch Vickers-Maxim mountain gun battery	549
3.2-inch field battery, to be carried on battery wagon	509-510
3.2-inch field battery. <i>See</i> Supply tables.	
Forge and battery wagon, siege battery	446-447
Infantry troops	627
Cavalry troops	680
Personnel of field battery	620
Personnel of siege battery	455
Rummet leather, for troops of cavalry	680
Seacoast posts	359
Those carried on forge and battery wagon, siege battery, not included in six months' supply	450
Those carried on forge and battery wagon for field battery, not included in six months' supply	512
Maneuvering, seacoast posts, list of	362
Targets, prices of	617
Those that are expendable	609
Drawing, allowance of, etc	321
Water colors, for battle charts, allowance of, etc	322
Saddlers—	
Allowance of, for 2.95-inch mountain battery	549
Allowance of, for cavalry (six months' allowance)	681
3.2-inch battery, six months' allowance	510-511
Those carried on forge and battery wagon, 3.2-inch battery, not to be included in six months' supply	512
Those carried on forge and battery wagon, for siege battery, not to be included in six months' supply	450

	Page.
Material—Continued.	
Materials on cavalry supply table to be called for only as needed, and in units, etc.....	632
Materials, expendable cavalry supply tables not to be dropped until expended, etc.....	632
Miscellaneous, allowance of, for—	
2.95-inch mountain battery. <i>See</i> Supply tables.	
3.2-inch field battery. <i>See</i> Supply tables.	
Siege battery. <i>See</i> Supply tables.	
Materials and supplies, certain kinds, etc., for battery mechanics issued by the Ordnance Department.....	367
Maximite, weight of charges adopted, etc.....	336
Maximum pressure, all guns. <i>See</i> Pressure.	
Measures, gallon, issue of, separately discontinued	356
Mechanical maneuvers, not to be practiced with new guns.....	363
Medals, issued as competition prizes remain property of United States.....	636
Metal scale arms for plotting boards, allowance of.....	318
Militia, provisions of law governing issue to, etc....	620-621
Model of guns marked on face of muzzle since 1894, prior on right trunnion.....	676
Mortars, B. L.:	
3.6-inch, model 1890, composition of battery not determined.....	523
How cared for in garrison service, etc.....	529
Mortar battery, 7-inch B. L. mortar, composition of, not determined	432
List of parts, nomenclature, etc.—	
3.6-inch, model 1890.....	524-526
7-inch, model 1892	433-435
12-inch, model 1886 (cast iron, steel hooped)	185-188
Model 1886-1890 M1 (eight in service).....	195-198
Model 1890 (steel).....	190-198
Model 1890 M1 (steel).....	200-208
12-inch not to be fired in twelfth zone.....	670
Principal differences between models 7-inch siege	441-443
Mountain guns:	
1.65-inch Hotchkiss.....	530
1.65-inch Hotchkiss (Paris model), old types not provided with firing mechanism, etc.....	531
3-inch Hotchkiss.....	539
Composition of—	
1.65-inch battery.....	534
2.95-inch (75 mm.) battery	549
3-inch Hotchkiss battery.....	542
Differences between 1.65-inch Paris and American models	532
Implement and equipments furnished with 3-inch Hotchkiss mountain gun and carriages...	541
List and nomenclature of parts—	
1.65-inch Hotchkiss gun (Paris model).....	531
American model.....	531-532
2.95-inch (75 mm.) Vickers-Maxim	542-543
3-inch Hotchkiss mountain gun.....	540
Parts of—	
1.65-inch Hotchkiss (Paris model), not interchangeable, etc.....	531
American model, not interchangeable, etc	532
Mounting, seacoast carriages, etc., Chief of Ordnance to be advised of commencement of work, etc.	675
Mounts:	
Casemate for 15-pounder R. F. gun, Driggs-Seabury.....	296
For Colt's automatic gun, caliber .80, component parts of	568
Masking parapet, list of parts, nomenclature, etc.—	
6-pounder Driggs-Seabury, 1898 modified (Nos. 21 to 60).....	290-291
15-pounder R. F. gun, Driggs-Seabury	298-299
Rampart, list of parts, nomenclature, etc.—	
6-pounder American Ordnance Company, (Nos. 1 to 10).....	292-293
6-pounder Driggs-Seabury, model 1898 (Nos. 1 to 20).....	299
Rapid-fire guns, in service, 6-pounder Driggs-Schroeder and Driggs-Seabury.....	282
Mushroom:	
All guns. <i>See</i> Obturator spindle.	
Spindles, all guns. <i>See</i> Obturator spindle.	
Muzzle energy:	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder), Mark II.....	286
Driggs-Seabury, model 1898.....	293
15-pounder R. F. gun, Driggs-Seabury	296
1.65-inch Hotchkiss mountain gun.....	530

Muzzle energy—Continued.

	Page.
3-inch Hotchkiss mountain gun	539
3.2-inch B. L. rifle, model 1885	456
Model 1897	461
3.6-inch B. L. rifle, model 1891	521
3.6-inch B. L. mortar, model 1890	524
4-inch R. F. gun (Driggs-Schroeder)	259
4.72-inch R. F. gun (Armstrong), 40 calibers	263
45 calibers	264
50 calibers	265
5-inch R. F. gun, O. D., model 1897	222
5-inch B. L. rifle, model 1890	394
5-inch B. L. rifle, siege, models 1896 and 1898 M1	397
6-inch R. F. gun (Armstrong)	278
6-inch R. F. gun, models 1897 and 1897 M1	233
6-inch R. F. gun, O. D., model 1900	236
7-inch B. L. Howitzer, model 1890	413
Model 1896	418
7-inch B. L. mortar, model 1892	433
8-inch B. L. rifle, model 1888	11
Model 1888 M1	16
Model 1888 M11	21
10-inch B. L. rifle, model 1888	51
Model 1888 M1	56
Model 1888 M11	61
Model 1896	64
Model 1896 M1	68
12-inch B. L. rifle, model 1888	119
Model 1888 M1	124
Model 1888 M 1½	129
Model 1888 M11	134
Model 1896	138
Model 1896 M1	141
12-inch B. L. mortar, model 1886 (cast iron, steel hooped)	189
Model 1886-1890 M1	199
Model 1890 (steel)	194
Model 1890 M1 (steel)	204

Muzzle preponderance:

10-inch B. L. rifle, model 1895 M1	68
12-inch B. L. rifle, model 1895 M1	141

Muzzle velocity. See Velocity muzzle.

N.

Name and direction plates. See Plates.

Nave boxes:

All 3.2-inch vehicles, interchangeable	517
3.2-inch used for siege ammunition wagon	446
Interchangeable for all vehicles of siege batteries	452
Nave box flange bolts, all 3.2-inch vehicles interchangeable	517

Neck yokes:

All 3.2-inch vehicles interchangeable	517
Ammunition wagon interchangeable with those of limber (siege carriage)	451
Fitted with pads, etc	452

Needle, 4.72-inch guns. See Firing pin.

Night sights. See Sights.

Nuts:

For hinge-pin hand lever. See Nuts; Operating lever pivot.	
Link connecting. See Nuts; Operating link.	
Hexagonal, assorted (spare)—	
8-inch carriages	43
10-inch carriages	106
12-inch carriages	180
12-inch B. L. mortar carriages	216
Operating lever pivot (spare)—	
4.72-inch R. F. guns (Armstrong)	270
6-inch R. F. guns (Armstrong)	275
Operating link (spare)—	
4.72-inch R. F. guns (Armstrong)	270
6-inch R. F. gun (Armstrong)	275

	Page.
Nuts—Continued.	
Piston rods (spare)—	
4.72-inch R. F. gun mounts.....	271
6-inch R. F. mounts (Armstrong)	279
	O.
O. K. dry cells. See Cells.	
Obturator, complete:	
3.2-inch B. L. rifle, model 1885.....	459
Model 1897.....	462
3.6-inch B. L. rifle, model 1891.....	522
3.6-inch B. L. mortar, model 1890.....	626
5-inch B. L. rifle, siege, model 1890.....	396
Model 1896-1898 M I.....	398
6-inch R. F. gun, O. D., model 1897.....	222
6-inch R. F. guns, O. D., models 1897, 1897 M I, and 1900.....	237
7-inch B. L. Howitzer, model 1890.....	416
Model 1896.....	419
7-inch B. L. mortar, model 1893.....	434
8-inch B. L. rifle, model 1888.....	7
Model 1888 M I.....	12
Model 1888 M II.....	17
10-inch B. L. rifle, model 1888.....	47
Model 1888 M I.....	52
Model 1888 M II.....	57
Model 1896.....	61
Model 1896 M I.....	65
12-inch B. L. rifle, model 1888.....	115
Model 1888 M I.....	120
Model 1888 M I ½.....	126
Model 1888 M II.....	130
Model 1896.....	135
Model 1896 M I.....	138
12-inch B. L. mortar, model 1886.....	186
Model 1886-1890 M I.....	196
Model 1890 (steel).....	191
Model 1890 M I (steel).....	201
(This term should never be used for "Obturator spindle".)	
Obturator lock nut, some 3.6-inch B. L. mortars to be discontinued, etc.....	526
Obturator spindle, complete:	
3-inch B. L. rifle, model 1888.....	7
Model 1888 M I.....	12
Model 1888 M II.....	17
10-inch B. L. rifle, model 1888.....	47
Model 1888 M I.....	52
Model 1888 M II.....	57
Model 1896.....	61
Model 1896 M I.....	65
12-inch B. L. rifle, model 1888.....	115
Model 1888 M I.....	120
Model 1888 M I ½.....	125
Model 1888 M II.....	130
Model 1896.....	135
Model 1896 M I.....	139
12-inch B. L. mortar, model 1886.....	186
Model 1886-1890 M I.....	196
Model 1890 (steel).....	191
Model 1890 M I.....	201
Obturator washer (spare):	
10-inch B. L. rifles, model 1896.....	69
12-inch B. L. rifles, model 1895.....	143
Model 1896 M I.....	139
Ordnance depots:	
To be provided with gauge and range rod for use in repair of revolvers.....	602
Supplied with tools for replacing recoil plates.....	602
Ordnance officers:	
Acting—	
Assigned to each artillery district, etc.....	367
Artillery district, to supervise requisitions, etc.....	367



Ordnance officers—Continued.	Page.
Must send drills and taps with long sight brackets issued for model 1888 guns, all calibers, etc.	676
Ordnance and ordnance stores, officers to see that commands are at all times completely equipped, etc.	563
Ordnance property:	
General authority of department commanders to order to arsenals designated by Chief of Ordnance for repairs.	560
Provisions of regulations and general orders relative to care, repair, instructions for use, etc.	667-669
Ordnance stores:	
Condemned, brass trimmings, how disposed of.	674
Experimental, disposition of.	672
Instructions relative to furnishing, etc.	673-674
Not to be condemned because unsightly, etc.	632
To be taken with them by companies changing stations, etc.	679
Oil:	
Allowance of, in supply tables to include trolley lines, etc.	361
Coal, issued for lanterns and cleaning purposes only.	450
Cosmoline, to be carried in small-arms oilers.	568
Cylinder—	
Issued in 5-gallon cans.	359
Not to be filtered.	359
Seacoast carriages, instructions for regulating, for reduced charges.	671-672
Drip pans. <i>See</i> Pans.	
Hydrolene—	
Allowance of, for siege batteries.	410
Issued exclusively for cylinders.	677
To siege batteries in lieu of neutral oil.	462
Not to be mixed with neutral oil.	361-677
Specifications for.	677
Light slushing, adopted for issue in place of petrolatum, etc.	361
New and old never to be mixed.	359
Seacoast carriages, specifications for.	676
Should be taken up on property returns in gallons.	353
Sperm—	
Issue of, for seacoast posts discontinued.	360
Issued for targets.	616
Taken from gun cylinders to be strained, etc.	359
Weight per gallon.	338
Oil storage tanks. <i>See</i> Tanks.	
Oilers, small-arms:	
Pocket 2-ounce, issued to troops serving in Tropics, allowance of, etc.	568
United States magazine caliber .30, allowance of, etc.	579
Operating crank, complete:	
10-inch B. L. rifle, model 1895.	63
Model 1895 M1.	66
12-inch B. L. rifle, model 1895.	136
Model 1895 M1.	140
Operating lever, complete:	
4.72-inch R. F. guns (Armstrong).	267
6-inch R. F. guns (Armstrong).	275
Operating lever pin. <i>See</i> Pin.	
Operating lever pivot nut. <i>See</i> Nut.	
Operating link, complete:	
4.72-inch R. F. guns (Armstrong).	267
6-inch R. F. guns (Armstrong).	275
Operating link nuts. <i>See</i> Nuts.	
Oscillating slide clamp handle. <i>See</i> Handles.	
Oscillating slide clamp screw. <i>See</i> Screw.	
P.	
Pack, ammunition, capacity of, for 2.95-inch mountain gun.	549
Pack outfits (saddles):	
Colt's automatic machine gun, caliber .30, component parts of.	570-571
Designed for issue with Colt's automatic machine gun, caliber .30.	570
Component parts of, for 1.65-inch mountain gun.	535-538
Details of load for 2.95-inch Vickers-Maxim gun and carriage.	548
How carried on returns.	535

	Page.
Pack outfits (saddles)—Continued.	
Kind, for 3-inch Hotchkiss mountain guns	542
Modified for 2.95-inch mountain gun, principal features of, etc	555
Number to be furnished with each 3-inch Hotchkiss mountain gun	542
Outfits, component parts of, for 2.95-inch mountain gun	552-554
Vickers-Maxim to remain in service until worn out and then replaced by modified saddle, etc	555
Packings:	
Cylinder head (spare), 15-pounder mount, Driggs-Seabury	299
For—	
Cylinders (spare), 15-pounder mount, Driggs-Seabury	299
Recoil cylinders (spare)—	
6-pounder Driggs-Seabury mounts	282
4-inch recoil mount (Driggs-Schroeder)	261
Garlocks, hydraulic (spare), 5-inch barbette carriage, balanced pillar mount, model 1896	272
"Garlocks," sizes and allowance of	351
Hydraulic (spare)—	
6-inch barbette carriage, model 1900, pedestal mount	256
6-inch disappearing carriage, L. F., model 1898	255
8-inch disappearing and barbette carriages	42
10-inch carriages	108
12-inch disappearing carriages	179
Packing boxes, special, for Lewis depression position finders	302
Packing and transportation	645
Pads:	
All guns. See Gas-check pad.	
Collar, siege batteries, issued when specifically called for	450
Pivot clamp screw (spare), 6-pounder Driggs-Seabury mounts	292
Scratch, not issued	676
Padilocks:	
Allowance of, for field batteries	517
Issued to post ordnance officers for armracks and armament chests only, etc	369
New pattern adopted for armracks	634
Will be exchanged for old, etc	634
Only issued for armracks, etc	636
Paints:	
All issued ready for use	351
Black and olive, how prepared and issued	678-679
For light batteries, issued mixed, etc	517
For projectiles—	
Allowance of	343
Distinctive colors, etc. See Projectiles.	
Instructions for removing old, from guns	670
Issued for target ranges, etc	615
Lithite—	
Issued to seacoast posts, allowance of	322
Not to be issued after, etc	322
Number of coats, etc., to be given seacoast carriages, etc	675
Parts of carriages not to be painted, etc	675
Should be taken up on property papers in gallons	363
Six months' allowance, 3.2-inch battery. See Supply tables.	
Weights per gallon	363
Pallets, steel, not to be removed from breech mechanisms	677
Pan, drip, list and allowance of, for issue	678
Paper, wrapping, not supplied to posts	676
Pastors:	
For field battery targets, allowance of	519
For small-arms targets, allowance of, etc	514
Paulins:	
For seacoast artillery not issued	354
List of special, issued for seacoast guns and carriages	369
Pawl-hook pins. See Pins.	
Pawl and stem, ratchet (spare), 15-pounder mount, Driggs-Seabury	290
Pencils, drawing, only, furnished by Ordnance Department	676
Penthouses:	
And other shelter not provided for seacoast artillery	676
For seacoast artillery not issued	354

Penetration in steel:	Page.
6-pounder R. F. guns, American Ordnance Company (Driggs-Schroeder), Mark II.....	286
6-pounder R. F. gun, Driggs-Seabury, model 1898.....	283
16-pounder R. F. gun, Driggs-Seabury.....	296
1.65-inch Hotchkiss mountain gun.....	580
3-inch Hotchkiss mountain gun.....	589
3.2-inch B. L. rifle, model 1888.....	458
3.2-inch B. L. rifle, model 1897.....	461
8-inch B. L. rifle, model 1888.....	11
Model 1888 M I.....	16
Model 1888 M II.....	20-21
10-inch B. L. rifle, model 1888.....	5
Model 1888 M I.....	56
Model 1888 M II.....	61
Model 1896.....	64
Model 1896 M I.....	67-68
12-inch B. L. rifle, model 1888.....	119
Model 1888 M I.....	124
Model 1888 I ½.....	129
Model 1888 M II.....	134
Model 1896.....	138
Model 1896 M I.....	141
12-inch B. L. mortar, model 1886, cast iron, steel hooped.....	189
Model 1886-1890 M I.....	199
Model 1890 (steel).....	194
Model 1890 M I (steel).....	204
Petrolatum, issue of, discontinued.....	361
Picket rope. <i>See</i> Rope.	
Pier mounts, for Warner and Swasey azimuth instruments.....	302
Pillar locking pins. <i>See</i> Pins.	
Pinch bars, allowance of, for issue per post, etc.....	378
Pin-securing cap squares. <i>See</i> Cap squares.	
Pins	
Cap-square locking, with chain and eyebolt (spare) 5-inch barbette carriage, balanced pillar mounting, model 1896.....	232
Cotter (spare), 15-pounder R. F. gun, Driggs-Seabury.....	297
Dowel, azimuth pointer (spare) 6-inch disappearing carriage, L. F. model 1898.....	255
Hinge (spare), 15-pounder R. F. gun, Driggs-Seabury.....	297
Locking, complete, for lower shield (spare), 6-pounder Driggs-Seabury mounts.....	232
Locking with chain and eyebolt, for top shield (spare), 5-inch barbette carriages, balanced pillar mounting, model 1896.....	232
Operating lever (spare), 15-pounder R. F. gun, Driggs-Seabury.....	297
Pawl-hook (spare)—	
8-inch disappearing carriages.....	43
10-inch disappearing carriages.....	108
Pawl, ratchet wheel (spare), 6-inch disappearing carriage, L. F., model 1898.....	255
Pillar locking with chain and eye-screw (spare), 6-inch barbette carriage, balanced pillar mount, model 1896.....	232
Piston rod (spare), 6-inch R. F. mount (Armstrong).....	279
Slide contact (spare), 6-inch R. F. guns, models 1897 and 1897 M I.....	240
Split—	
4-inch (spare)—	
6-pounder Driggs-Seabury mounts.....	292
15-pounder mounts, Driggs-Seabury.....	299
6-inch barbette carriage, balanced pillar mount, model 1896.....	232
4-inch (spare)—	
6-pounder Driggs-Seabury mounts.....	292
5-inch barbette carriage, balanced pillar mount, model 1896.....	232
4-inch (spare), 15-pounder mounts, Driggs-Seabury.....	299
Split (spare)—	
6-inch barbette carriage, model 1900, pedestal mount.....	286
8-inch disappearing and barbette carriages.....	42
10-inch disappearing and barbette carriages.....	108
12-inch carriages.....	180
12-inch B. L. mortar carriages.....	216

Pins—Continued.

Split—	
Extractor dog pivot (spare), 6-inch R. F. gun (Armstrong)	28
Hinge pin (spare), 6-inch R. F. gun (Armstrong)	28
Operating link (spare), 6-inch R. F. gun (Armstrong)	28
Suspension chain fork (spare), 5-inch barbette carriage, balanced pillar mount, model 1896.	2
Taper (spare)—	
8-inch disappearing and barbette carriage	1
10-inch disappearing and barbette carriages	17
12-inch disappearing and barbette carriages	17
12-inch B. L. mortar carriages	22
Taper, for elevating level pinion shaft (spare), 4-inch recoil mount (Driggs-Schroeder)	22
Target frame, not issued with spare parts of frame	63
Traversing pinion (spare), 5-inch barbette carriage, balanced pillar mounting, model 1896..	2
Pioneer tools. <i>See</i> Tools.	
Pipergins. <i>See</i> Gins.	
Pistol, electrical:	
Complete (spare), for 6-inch R. F. gun mount (Armstrong)	73
With sounder (spare), 4.72-inch R. F. gun mount	5.
Piston rod, complete (spare):	
4.72-inch R. F. gun mounts	27
6-inch R. F. mount (Armstrong)	27
Pivot, ball bearing. <i>See</i> Ball bearing.	
Pivot clamp screw. <i>See</i> Screw.	
Pivot clamp-screw pad. <i>See</i> Pad.	
Pivot-hole covers. <i>See</i> Cover.	
Pivots, spring (spare), 6-inch disappearing carriage, L. F., model 1896	5
Pivot yoke. <i>See</i> Yoke.	
Plates, name and direction, not to be removed from carriage when painting	10
Platforms:	
Field, if used with 5-inch carriages, models 1896, and 7-inch, model 1893, latter require certain elevations, etc	8
List of parts, material, etc., for—	
3.6-inch B. L. mortar carriages	10
7-inch B. L. mortar carriages	10
Siege (field), list of component parts, weight, etc	10
Siege (semipermanent), list of component parts, weights, etc	10
Platform wagon. <i>See</i> Wagon.	
Pliers, not issued to cavalry	2
Plotting boards:	
Allowance of	10
Instructions for making requisitions for	10
Necessity for special sizes must be stated	10
Old style, and models abolished, etc., to be retained as drawing boards, etc	10
Whistler, adopted for service, allowance of, etc	10
Zinc tops	10
Plugs:	
Air hole (spare)—	
4-inch recoil mounts (Driggs-Schroeder)	1
4.72-inch R. F. gun mount	1
6-inch B. F. mounts (Armstrong)	1
Cylinder (spare)—	
4.72-inch R. F. gun mount	1
6-inch R. F. mount (Armstrong)	1
Drain for elevating and traversing brackets (spare)—	
8-inch disappearing carriages	1
10-inch disappearing carriages	1
12-inch carriages	1
12-inch B. L. mortar carriages	1
Drain hole (spare)—	
4.72-inch R. F. gun mount	1
6-inch R. F. mount (Armstrong)	1
Emptying (spare)—	
8-inch barbette carriage	1
10-inch barbette carriages	1
12-inch carriages	1

Plugs—Continued.

	Page.
Filling (spare)—	
6-inch barbette carriage, model 1900, pedestal mount	256
6-inch disappearing carriage, L. F., model 1896	255
8-inch disappearing and barbette carriages	42
10-inch disappearing and barbette carriages	107
12-inch carriages	179
12-inch B. L. mortar carriages	216
Filling and drain (spare) 6-inch barbette carriage, balanced pillar mounting, model 1896 ..	232
Filling hole (spare)—	
4-inch recoil mount (Driggs-Schroeder)	261
4.72-inch R. F. gun mount	271
6-inch R. F. mount (Armstrong)	279
Front sight—	
10-inch B. L. rifle, model 1896	68
Model 1896 M1	67
12-inch B. L. rifle, model 1896 M1	140
12-inch B. L. rifle, model 1896	137
Oil hole—	
0.375-inch (spare), 6-inch disappearing carriage, L. F., model 1896	255
0.625-inch (spare), 6-inch disappearing carriage, L. F., model 1896	255
1-inch (spare), 4-inch recoil mount (Driggs-Schroeder)	202
1-inch (spare), 6-inch barbette carriage, balanced pillar mount, model 1896	232
1-inch (spare), 6-inch barbette carriage, balanced pillar mount, model 1896	232
1-inch (spare), 6-inch barbette carriage, balanced pillar mount, model 1896	232
Oil hole (spare)—	
8-inch disappearing and barbette carriages	42
10-inch disappearing and barbette carriages	108
12-inch disappearing and barbette carriages	179
12-inch B. L. mortar carriages	216
Rear sight—	
10-inch B. L. rifle, model 1896	68
Model 1896 M1	67
12-inch B. L. rifle, model 1896	137
Model 1896 M1	140
Spring rod (spare)—	
12-inch B. L. mortar carriages	216
Tank-cleaning hole (spare)—	
4.72-inch R. F. gun mount	271
6-inch R. F. gun mount (Armstrong)	279
Vent (spare)—	
8-inch disappearing carriage	42
Plunger (spare), 15-pounder R. F. gun, Driggs-Seabury	297
Plunger spring. <i>See</i> Spring.	
Pointers, azimuth, with screws (spare), 12-inch B. L. mortar carriages	216
Pointing scale. <i>See</i> Scale.	
Poles:	
Ammunition wagon interchangeable with that of limber (siege carriage)	461
For—	
3.2-inch limbers, modified	518
3.2-inch vehicles, all interchangeable	517
Poleseats for 3.2-inch limbers, modified	518
Polishing material, not to be used on depression position-finders	307
Posts:	
List of, to be equipped with power machine shops	365
Seacoast, divided into districts for power machine shop purposes	364
Powder:	
All charges for seacoast and field guns to be issued made up	333
Blank charges, list of all guns	355
Brown prismatic—	
For different calibers not interchangeable	343
Limited quantity on hand of B. L. rifles to be used for test of armament, etc.	333
Mortar to be used until exhausted	333
Chamber. <i>See</i> Chamber.	
Charges:	
Allowance of, for field batteries in salutes, etc	354
Average weight, maximum muzzle velocities and corresponding pressures	336

Powder—Continued.	Page.
Charges—Continued.	
How to be accounted for on property papers.....	334
How to be arranged in magazines.....	334
Made at post, proof velocity to be obtained from Chief of Ordnance.....	335
Invoices and receipts to give lot numbers.....	342
Nitroglycerine and nitrocellulose, not to be blended.....	342
Reduction of weights of charges to be made in accordance with instructions of Ordnance Department.....	339
Saluting charges—	
For 8-inch, 10-inch, and 12-inch guns.....	342
Instructions to be followed in use.....	342
Samples for instruction purposes—	
Allowance of, etc.....	362
To be taken up on property papers.....	362
Service charges for service guns to be issued, made up by Ordnance Department.....	353
Smokeless—	
Cartridges, dimensions of.....	336
Charges, reserve target practice, how marked.....	334
Densities of loading, not to be exceeded.....	335
For mortars, to be issued in charges made up.....	336
Not to be exposed to sun for drying.....	342
Small arms, to be issued for gallery practice after, etc.....	361
Service powder for all purposes except, etc.....	333
Will not be issued in bulk.....	333
Sphero-hexagonal used for short ranges of mortars.....	333
Weight of charge, density of loading, etc.—	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder), Mark II.....	286
Mark III.....	286
6-pounder R. F. gun, Driggs-Seabury, model 1898.....	283
Model 1900.....	284
15-pounder R. F. gun, Driggs-Seabury.....	286
1.65-inch Hotchkiss mountain gun.....	530
2.95-inch (76 mm.) Vickers-Maxim mountain gun.....	544
3-inch Hotchkiss mountain gun.....	539
3.2-inch B. L. rifle, model 1885.....	466
Model 1897.....	461
3.6-inch B. L. mortar, model 1890.....	529
3.6-inch B. L. rifle, model 1891.....	531
4-inch R. F. gun (Driggs-Schroeder).....	259
4.72-inch R. F. gun (Armstrong) 40 calibers.....	263
45 calibers.....	264
60 calibers.....	265
5-inch B. L. rifle, siege, models 1898 and 1898 M1.....	397
5-inch B. L. rifle, model 1890.....	394
5-inch R. F. gun, O. D., model 1897.....	221
6-inch R. F. guns, models 1897, 1897 M1, and 1900.....	235-236
6-inch R. F. gun (Armstrong).....	273
7-inch B. L. howitzer, model 1890.....	414
Model 1898.....	418
7-inch B. L. mortar, model 1892.....	432
8-inch B. L. rifle, model 1888.....	11
Model 1888 M1.....	16
Model 1888 M11.....	30
10-inch B. L. rifle, model 1888.....	61
Model 1888 M1.....	56
Model 1888 M11.....	61
Model 1895.....	64
Model 1895 M1.....	67
12-inch B. L. rifle, model 1888.....	119
Model 1888 M1.....	124
Model 1888 M11.....	129
Model 1888 M11.....	134
Model 1890.....	137
Model 1895 M1.....	141
12-inch B. L. mortar, model 1886, cast iron, steel hooped.....	199
12-inch B. L. mortar, model 1890 (steel).....	194
Model 1890 M1 (steel).....	304
Model 1898 M1.....	199

Welder—Continued.	Page.
Weight of charge, density of loading, etc.—Continued.	
For mortars for various zones.....	338
Weight of igniters for various charges.....	336
Witt's ballistic boards. <i>See</i> Ballistic boards.	
Working scales. <i>See</i> Auxiliary scales.	
Preponderance. <i>See</i> Munition preponderance.	
Secure cylinders for crusher gauges, number issued.....	372
Secure gauges (<i>see also</i> Gauges). To be used with 5-inch R. F. gun, O. D.....	225
Pressure, maximum:	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder), Mark II.....	286
6-pounder R. F. gun, Driggs-Seabury, model 1898.....	283
15-pounder R. F. gun, Driggs-Seabury.....	295
1.457-inch Vickers-Maxim mountain gun.....	572
1.65-inch Hotchkiss mountain gun.....	580
3-inch Hotchkiss mountain gun.....	589
3.2-inch B. L. rifle, model 1895.....	456
Model 1897.....	461
3.6-inch B. L. rifle, model 1891.....	521
3.6-inch B. L. mortar, model 1890.....	524
4.72-inch R. F. gun (Armstrong)—	
40 calibers.....	268
45 calibers.....	264
50 calibers.....	265
5-inch B. L. rifle, model 1890.....	394
5-inch B. L. rifle, siege, models 1898 and 1896 M I.....	397
5-inch R. F. gun, O. D., model 1897.....	221
6-inch R. F. gun (Armstrong).....	273
6-inch R. F. guns, O. D., models 1897 and 1897 M I.....	285
Model 1900.....	326
7-inch B. L. howitzer, model 1890.....	414
Model 1898.....	413
7-inch B. L. mortar, model 1892.....	438
8-inch B. L. rifle, model 1888.....	11
Model 1888 M I.....	16
Model 1888 M II.....	20
10-inch B. L. rifle, model 1888.....	51
Model 1888 M I.....	56
Model 1888 M II.....	51
Model 1896.....	54
Model 1896 M I.....	57
12-inch B. L. rifle, model 1888.....	119
Model 1888 M I.....	124
Model 1888 M I ½.....	129
Model 1888 M II.....	134
Model 1896.....	136
Model 1896 M I.....	141
12-inch B. L. mortar, model 1896 (cast iron, steel hooped).....	199
Model 1896-1890 M I.....	204
Model 1890 (steel).....	194
Primers:	
Cannon, packed, hermetically sealed.....	352
Cases of obturating electric and friction to be cleaned and turned in, etc.....	354
Drill outfit, description, list of parts of, etc.....	353-354
For use of field batteries in salutes, allowance of.....	354
List of, for use with—	
6-pounder R. F. guns.....	294
15-pounder R. F. guns, Driggs-Seabury.....	297
3.2-inch B. L. rifles.....	464
3.6-inch B. L. mortars.....	526
4.72-inch R. F. gun (Armstrong).....	270
5-inch R. F. guns, O. D.....	225
5-inch B. L. rifles, siege.....	401
6-inch R. F. guns, O. D.....	240
6-inch R. F. guns (Armstrong).....	277
7-inch B. L. howitzers.....	423
7-inch B. L. mortars.....	435
8-inch B. L. rifles.....	
10-inch B. L. rifles.....	

	Page.
Primers—Continued.	
List of, for use with—Continued.	
12-inch B. L. rifles	167
12-inch B. L. mortars	205
List of standard primers for all guns	252
Not to be stored in powder magazines	253
Obturator friction, directions for pulling	253
Small arms, packed damp-proof boxes	250
Sectional, for instructions, etc., allowance of	250
Principal differences between models of siege artillery guns	441-443
Prisms, erecting of telescopes of position-finders, to be supplied with locking nuts, etc.	316
Prizes, competition small arms, rules governing same	634-635
Projectiles:	
Color indicating bursting charge, not to be applied until loaded	243
Dummy—	
Allowance of, for issue 7-inch B. L. howitzer	431
To siege batteries	413
All calibers of guns, description and allowance of, etc.	343-344
For light batteries, allowance of, for issue	519
How painted, distinctive colors, instructions for, etc.	342-343
Kind, dimensions, etc.—	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder), Mark II	226
Mark III	228
6-pounder R. F. gun, Driggs-Seabury, model 1900	225
Model 1896	223
15-pounder R. F. gun, Driggs-Seabury	225
1.457-inch Vickers-Maxim mountain gun	572
1.65-inch Hotchkiss mountain gun	530
3-inch Hotchkiss mountain gun	530
3.2-inch B. L. rifle	457-459
3.6-inch B. L. rifle	521
3.6-inch B. L. mortar, model 1890	504
4-inch R. F. gun (Driggs-Schroeder)	220
4.72-inch R. F. guns (Armstrong)	263-264-265
5-inch R. F. guns, O. D., model 1897	221
5-inch B. L. rifle, siege	393-394
6-inch R. F. gun (Armstrong)	273
6-inch R. F. gun, O. D.	225-226
7-inch B. L. howitzer	414-417
7-inch B. L. mortar, model 1892	432
8-inch B. L. rifle, model 1888	11
Model 1888 M I	15
Model 1888 M II	20
10-inch B. L. rifles	51-55-60
12-inch B. L. rifles	64, 119-124, 129-134, 137-141
12-inch B. L. mortars, model 1896, cast iron, steel hooped	120
Model 1890 (steel)	124
Model 1886-1890 M I	129
Model 1890 M I (steel)	208
Seacoast, how to be piled in magazine	343
Property:	
Accountability, regulations pertaining thereto	663-664
Damaged, lost, destroyed, etc., regulations pertaining thereto	663
For condemnation, regulations pertaining thereto	666-667
Issued by "group names," how accounted for	677
Memorandum receipts not allowed	663
Ordnance. See Ordnance property.	
Public, accountability and responsibility, regulations pertaining thereto	660-663
Returns, administration examination thereof, regulations pertaining thereto	664
Publications, list of, issued by Ordnance Department	679-682
Punches, revolving, not issued to infantry	628
Spring, not issued to infantry	628
Putz-pomade, allowance of, seacoast posts	362
Not issued to cavalry	631

Q.		Page.
Quadrants:		
Gunnery—		
Allowance of, for issue to—		
3.6-inch B. L. mortars		536
Siege batteries		401
Howitzer batteries		422
7-inch B. L. mortars		436
12-inch B. L. mortars		294
Essential differences in models, etc.		325
List of parts, models 1892, 1897, and 1898		325
R.		
Rails, inside, target, issued as needed		613
Ram, controlling, complete (spare):		
4.72-inch R. F. gun mount		371
6-inch R. F. mount (Armstrong)		379
Rammer heads, extra, issued as needed		654
Rammer and staffs for 3.2-inch field gun, nomenclature to be followed		519
Range finders, Weldon:		
Allowance of, for issue to—		
3.2-inch B. L. rifle batteries		46
5-inch siege battery		403
Field batteries		311
Howitzer batteries		423
Range rods, for use in repair of revolvers, to be supplied to ordnance depots		603
Range tables. <i>See</i> Tables.		
Rapid-fire guns:		
6-pounder in service, Driggs-Schroeder and Driggs-Seabury		289
List of parts, nomenclature, etc.—		
4.72-inch (Armstrong), calibers 40, 45, and 50		280-289
5-inch, O. D., model 1897		222
6-inch (Armstrong)		273
6-inch, O. D., model 1897, 1897 M1, and 1900		257
Principal parts of breech mechanism—		
6-pounder, American Ordnance Company (Driggs-Schroeder), Mark II		285
Mark III		287
6-pounder, Driggs-Seabury, model 1898		282-283
Model 1900		284
15-pounder, Driggs-Seabury		295
4-inch, Driggs-Schroeder		259
Ratchet, levers. <i>See</i> Levers.		
Ratchet pawl. <i>See</i> Pawl.		
Ratchet wheel. <i>See</i> Wheel.		
Ratchet wheel pawl pin. <i>See</i> Pin.		
Reading glasses. <i>See</i> Hand magnifying.		
Rear exterior split rings, all guns. <i>See</i> Split ring, rear.		
Rear stuffing-box studs. <i>See</i> Studs.		
Recoil rope. <i>See</i> Rope.		
Recoil sleeve key. <i>See</i> Key.		
Reforming tools. <i>See</i> Tools.		
Regulations, general, pertaining to ordnance property		655-656
Relocator boards, not adopted		319
Reloading tools. <i>See</i> Tools.		
Repairs of—		
Depression position finders, to be directed by Ordnance Department, necessity for same to be promptly reported		307
Field batteries, instructions relative to making, etc.		673-674
Reports:		
Monthly, on Form 41-a, to be forwarded through Department ordnance officer		674
Seacoast artillery practice, forms, etc.		670
Shots fired in target practice to be made to Chief of Ordnance		358
Regulations:		
First to be referred to post ordnance officer for issue, etc.		632

Rapid-fire guns—Continued.**Regulations:****For—**

Ammunition for target practice, to be made three months in advance	343
Armament chests, how to be made, etc.	378
Assembled parts of carriages, limbers, etc., must be clear as to parts, etc.	518
Bars for badges must state year of qualification, etc.	634
Bolts, nuts, etc., for 3.2-inch carriages, caissons, etc., must give sizes as shown in tables, number of carriage, caisson, etc., for which wanted	518

Cleaning materials—**For—**

Box, should be what is required only, etc.	628
Horse equipments, must state kind of equipments, etc.	517
Infantry to be made annually	628
In excess for infantry, must state necessity, etc.	627
Seacoast posts, to give armament of posts	361
To be made semiannually	361

For—

Cotton cloth should be by the yard	614
Dummy projectiles, to state, etc.	344
Excess materials, cavalry, must state necessity, etc.	632
Excessive supply of materials for cleaning, etc., siege batteries must state necessity therefor, etc.	450
Expendable supplies, to be made semiannually	594
"Garlocks" packing, to give model of carriage	361
Gaskets, must state model and caliber of carriage, exact joint, etc.	676
Gunnery gimlets, etc., must state model of gun, etc., for which required	675
Insignia to replace lost ones to be accompanied by certificate, etc.	634
Instruments and materials for fire-control system, to be approved by Chief of Artillery	304
Materials 3.2-inch battery in excess of tables, must give necessity, etc.	512
Must state amount on hand	512
Materials for cleaning saddles, siege battery, must state amount on hand, etc.	450
Organizations equipped with horse equipments, must state kind, russet or black, etc.	679
Parts of—	
2.96-inch mountain gun and carriages, must state maker and model of gun, etc.	547
Revolving targets, must state size, and kind, etc.	611
Target frames for Texas targets, must state size of frames	611
Rammers and staffs, etc., 3.2-inch field gun, nomenclature to be followed	517
Repairs, 3.2-inch carriages, caissons, etc., must give the number of carriage, caisson, etc. ..	517
Reserve ammunition, only to be made when magazines are available, etc.	343
Sash cord, must state for what purpose required	517
Seacoast armament, instructions for making, by district armament officers	367
Seacoast posts, to be forwarded through district commanders and supervised by acting ordnance officer of district	367
Sights, for rifle or carbines, must state model of arms and sight	589
Snap hooks—	
How to be made, etc.	679
Must state kind required	515
Spare parts for—	
3.2-inch field carriages, must give model and number of carriage	500
5-inch siege carriage, should state model and number of carriage, etc.	445
7-inch howitzer carriage, should state number and model of carriage, etc.	446
Guns and carriages, instructions relative to making to be followed	677
Remington shotgun, must state model of gun, etc.	608
Revolvers, must give amount on hand	608
In excess, must state fully reasons, etc.	608
Small arms, must state model of arms	589
To be made by company commanders under certain conditions, etc.	589
Targets, must give size, kind, etc.	614
United States magazine rifle and carbines, must give number on hand	586
Specified ordnance stores, small-arms ammunition, target supplies, etc., to be made annually	516
Sponges and rammers, sponge covers, etc., must state kind of gun, etc.	634
Sponge and rammer staff 5-inch B. L. rifle, should state length of section, etc.	413
Supplies, cavalry, must state amount on hand	632
Targets, to be explicit, etc.	617
Should state system, size, etc.	608
And target materials, must be made by acting ordnance officer	617

MISSING—Continued.

	Page.
16-pounder R. F. gun, Driggs-Seabury.....	296
1 65-inch Hotchkiss mountain gun.....	530
3-inch Hotchkiss mountain gun.....	539
3.2-inch B. L. rifle, model 1885.....	458
Model 1897.....	461
3.6-inch B. L. rifle, model 1891.....	521
3.6-inch B. L. mortar, model 1890.....	524
4.72-inch R. F. gun (Armstrong)—	
40 calibers.....	264
45 calibers.....	265
50 calibers.....	266
5-inch B. L. rifle, model 1890.....	394
5-inch B. L. rifle, siege, models 1896 and 1898 M1.....	397
5-inch R. F. gun, O. D., model 1897.....	222
6-inch R. F. gun (Armstrong).....	273
6-inch R. F. gun, models 1897 and 1897 M1.....	235
6-inch R. F. gun, O. D., model 1900.....	236
7-inch B. L. howitzer, model 1890.....	415
Model 1898.....	413
7-inch B. L. mortar, model 1892.....	433
8-inch B. L. rifle, model 1888.....	11
Model 1888 M1.....	16
Model 1888 M1r.....	21
10-inch B. L. rifle, model 1888.....	52
Model 1888 M1.....	56
Model 1888 M1r.....	61
Model 1896.....	64
Model 1896 M1.....	66
Model 1900.....	66
12-inch B. L. rifle, model 1888.....	119
Model 1888 M1.....	125
Model 1888 M1j.....	130
Model 1888 M1r.....	135
Model 1896.....	
Model 1896 M1.....	141
Model 1900.....	141
12-inch B. L. mortar, model 1886, cast-iron, steel-hooped.....	189
Model 1890 (steel).....	194
Model 1896-1890 M1.....	199
Model 1890 M1 (steel).....	204
Rivets for ammunition trucks:	
8-inch disappearing carriages.....	42
10-inch disappearing carriages.....	106
12-inch carriages.....	180
12-inch B. L. mortar carriages.....	216
Rivets and burrs:	
Brass, only issued to field batteries.....	517
Copper, issue discontinued.....	452
Issue to field batteries discontinued.....	517
Rods, marking:	
For gallery targets, issued, etc.....	616
Not expendable.....	616
Roller handspikes. See Handspikes.	
Rollers, antifriction (spare), 4-inch recoil mount (Driggs-Schroeder).....	262
Roller bearings (spare):	
8-inch disappearing carriages.....	42
Issued to district armament officers.....	42
10-inch disappearing carriages.....	106
Issued to district armament officers.....	106
12-inch disappearing carriages.....	180
Issued to district armament officers.....	180
Mossberg's (spare) 6-inch disappearing carriage, L. F., model 1898, issued to district arma- ment officers.....	256
Roller lift hook, 12-inch disappearing carriage, model 1901.....	134
Ropes:	
Brake, added to equipment 1.65-inch mountain gun.....	594
3-inch, issued to siege batteries.....	446
Instructions for ascertaining strain rope will bear.....	382

	Page
Rope—Continued.	
Manila—	
Approximate weight per foot.....	382
Table showing weight it will sustain.....	382
Picket, issued to light batteries with metal screw joints, etc.....	517
Recoil, issued with 8.6-inch mortar carriages.....	528
Size to be given measured on circumference.....	382
Crane (spare)—	
8-inch barbette carriages.....	43
10-inch barbette carriages.....	108
12-inch barbette carriages.....	180
Retraction (spare)—	
6-inch disappearing carriage, L. F., model 1898.....	256
8-inch disappearing carriages.....	42
10-inch disappearing and barbette carriages.....	108
Trace. <i>See</i> Trace ropes.	
Wire retraction (spare), 12-inch disappearing and barbette carriages.....	180
Rotating crank, complete, list of parts of:	
8-inch B. L. rifle, model 1888.....	9
Model 1888 Mi.....	13-14
Model 1888 Mil.....	18
10-inch B. L. rifle, model 1888.....	49
Model 1888 Mi.....	54
Model 1888 Mil.....	58
12-inch B. L. rifle, model 1888.....	117
Model 1888 Mi.....	122
Model 1888 M 14.....	127
Model 1888 Mil.....	132
Rotating crank catch, all guns. <i>See</i> Rotating crank lock bolt.	
Rotating crank lock bolt (spare):	
8-inch B. L. rifles.....	22
10-inch B. L. rifles, models 1888.....	69
12-inch B. L. rifles, models 1888.....	142
Rotating crank lock handle (spare):	
8-inch B. L. rifles.....	22
10-inch B. L. rifles, models 1888.....	69
12-inch B. L. rifles, models 1888.....	142
12-inch B. L. mortars.....	206
Rotating crank lock-handle pin (spare):	
8-inch B. L. rifles.....	22
10-inch B. L. rifles, model 1888.....	69
12-inch B. L. rifles, model 1888.....	142
12-inch B. L. mortars.....	206
Rotating crank lock plate:	
Lower (spare)—	
8-inch B. L. rifles.....	22
10-inch B. L. rifles, model 1888.....	69
12-inch B. L. rifles, model 1888.....	142
Upper (spare)—	
8-inch B. L. rifles.....	22
10-inch B. L. rifles, model 1888.....	69
12-inch B. L. rifles, model 1888.....	142
Screws (spare), 8-inch B. L. rifle.....	22
Rotating crank lock screws (spare), 10-inch B. L. rifles, model 1888.....	69
Rotating crank lock spring (spare):	
8-inch B. L. rifles.....	22
10-inch B. L. rifles, model 1888.....	69
12-inch B. L. rifles, model 1888.....	142
12-inch B. L. mortars.....	206
Rotating crank lock front stud (spare), 12-inch B. L. mortars.....	206
Rear stud (spare).....	206
Rotating crank lock washer (spare):	
8-inch B. L. rifles.....	22
10-inch B. L. rifles, model 1888.....	69
12-inch B. L. rifles, model 1888.....	142
Rotten stone, not issued to infantry troops.....	528

S.		Page.
Sabers:		
Cavalry, field and artillery, component parts of.....		619
List of men of siege battery to be so equipped.....		462
Officers'—		
Component parts of.....		618
Uniform for all officers except chaplain.....		618
Principal dimensions of.....		619
To be purchased by officers.....		618
Twenty-eight to each battery of field artillery.....		618
Weights and centers of gravity.....		620
Saddle cloths, officers' made to order, etc.....		628
Saddles:		
Proportions of sizes in which furnished to cavalry.....		629
Whitman, sold to officers.....		628
Saddlers' material. <i>See</i> Material.		
Saddlers' tools. <i>See</i> Tools.		
Safety:		
Attachments, for firing attachments 4.72-inch and 6-inch (Armstrong) R. F. guns, instructions for adjusting, etc.....		670
Bar, 6-inch R. F. gun, O. D., model 1900.....		241
Cam spring. <i>See</i> Springs.		
Device, complete—		
4.72-inch R. F. guns (Armstrong).....		268
6-inch R. F. gun (Armstrong).....		276
Device (spare)—		
4.72-inch R. F. guns (Armstrong).....		270
6-inch R. F. gun (Armstrong).....		278
Lanyard attachment. <i>See</i> Lanyard attachment.		
For disappearing carriages, instructions for using and adjusting.....		218-219
Latch stops. <i>See</i> Stops.		
Stop, 4.72-inch guns. <i>See</i> Safety device.		
Sal soda, instructions how to use, etc.....		627
Issued with cleaning material, allowance of, etc.....		627
Salutes:		
Breech-loading guns to be used in the absence of, etc.....		355
Charges for, allowance of, for field batteries.....		354
Guns with metallic ammunition to be used for firing name, etc.....		355
Instructions for firing, care to be exercised, etc.....		355
To be fired under charge of commissioned officer.....		355
Saluting charges:		
All guns, list of.....		355
Metallic ammunition to be assembled at post.....		355
Sand glasses. <i>See</i> Glasses.		
Scabbards for—		
General officers' sabers, provided with stars, etc.....		618
Officers' sabers will be furnished separately.....		618
Scales:		
Auxiliary, allowance of, etc.....		319
To be dispensed with by Whistler board.....		319
Diagonal tangent, kind issued and allowance of.....		320
Gun commander's range, issued by Ordnance Department, allowance of, etc.....		320
Pointing, for 3.6-inch B. L. field mortar, list of parts of.....		325
Scale arms:		
Brass, for harbor battle charts, allowance of, etc.....		329
Necessity for special sizes must be stated.....		319
Screws:		
Clamp, oscillating slide (spare), 6-pounder mount, Driggs-Seabury.....		292
Pivot socket (spare), 15-pounder mount, Driggs-Seabury.....		299
Pivot clamp (spare), 6-pounder mount, Driggs-Seabury.....		292
Yoke, set (spare), 15-pounder mount, Driggs-Seabury.....		299
Yoke clamping (spare), 15-pounder mount, Driggs-Seabury.....		299
Air-hole (spare), 15-pounder mount, Driggs-Seabury.....		299
Azimuth pointer (spare), 6-inch disappearing carriage, L. F., model 1898.....		255
Breechblock oil-hole (spare)—		
6-inch R. F. gun, O. D., model 1897.....		225
6-inch R. F. gun, models 1897 and 1897 M1.....		240
Model 1900.....		241

Screws—Continued.	Page
Breechlock oil-hole (spare)—Continued.	
8-inch B. L. rifles.....	22
10-inch B. L. rifles, models 1888.....	69
Models 1896.....	70
12-inch B. L. rifles, models 1888.....	143
Models 1896.....	145
Buffer, for oscillating slide (spare), 15-pounder mount, Driggs-Seabury.....	239
Clamp, for sight holder (spare)—	
8-inch disappearing carriages.....	42
12-inch disappearing carriages.....	106
12-inch carriages.....	140
Driver, United States magazine rifle, caliber .30, allowance of, etc.....	579
Elevation stop (spare), 15-pounder mount, Driggs-Seabury.....	239
Elevation scale (spare), 8-inch barbette carriage.....	42
Elevation pointer (spare)—	
8-inch disappearing carriage, L. F., model 1898.....	255
8-inch disappearing carriages.....	42
10-inch disappearing carriages.....	106
12-inch disappearing carriages.....	179
Filling hole (spare)—	
6-pounder, Driggs-Seabury mounts.....	238
15-pounder mount, Driggs-Seabury.....	239
For—	
Elevating shafts (spare), 4-inch recoil mount (Driggs-Schroeder).....	25
Firing cable supports (spare), 8-inch R. F. gun, O. D., model 1897.....	225
Floor plates (spare)—	
8-inch carriages.....	42
10-inch carriages.....	106
12-inch carriages.....	140
12-inch B. L. mortar carriages.....	216
Name and direction plate (spare)—	
6-inch disappearing carriage, L. F., model 1898.....	255
8-inch carriages.....	42
10-inch carriages.....	106
12-inch carriages.....	140
12-inch B. L. mortar carriages.....	216
Platform (spare), 8-inch carriages.....	42
Side contact bracket (spare), 6-inch R. F. gun, O. D., model 1900.....	241
Spring covers (spare), 6-inch barbette carriage (pedestal mount), model 1900.....	256
Traversing bevel pinion collar (spare), 4-inch recoil mount (Driggs-Schroeder).....	262
Worm (spare), 4-inch recoil mount (Driggs-Schroeder).....	262
Headless (spare) 6-inch disappearing carriage, L. F., model 1898.....	255
Hinge-pin oil hole (spare)—	
6-inch R. F. gun, O. D., model 1897.....	225
6-inch R. F. gun, R. F., models 1897 and 1897 M1.....	240
6-inch R. F. gun, O. D., model 1900.....	241
8-inch B. L. rifles, models 1888.....	22
10-inch B. L. rifles, models 1888.....	69
10-inch B. L. rifles, model 1896.....	70
12-inch B. L. rifles, models 1888.....	143
Models 1896.....	143
12-inch B. L. mortars.....	206
Indicator arc and rack (spare), 10-inch barbette carriages.....	106
12-inch barbette carriages.....	179
Nut bind adjusting (spare), 4-inch recoil mount (Driggs-Schroeder).....	261
Oil hole (spare)—	
15-pounder mount, Driggs-Seabury.....	239
4.72-inch R. F. gun (Armstrong).....	270
6-inch R. F. gun (Armstrong).....	278
Piston (spare), 4-inch recoil mount (Driggs-Schroeder).....	261
Pivot-hole (spare), 4-inch recoil mount (Driggs-Schroeder).....	261
Rear axial sight—	
8-inch B. L. rifle, model 1888.....	10
Model 1888 M1.....	15
Model 1888 M11.....	30

Screws—Continued.	Page.
Rear axial sight—Continued.	
10-inch B. L. rifle, model 1888.....	50
Model 1888 M I.....	55
Model 1888 M II.....	60
Model 1895.....	68
Model 1895 M I.....	67
12-inch B. L. rifle, model 1888.....	118
Model 1888 M I.....	123
Model 1888 M 14.....	123
Model 1888 M II.....	133
Model 1895.....	137
Model 1895 M I.....	140
Rotating crank lock plate (spare), 12-inch B. L. rifles, models 1888.....	143
Sight bracket adjusting, uniform.....	332
Sight locking (spare), 8-inch disappearing carriages, L. F., model 1898.....	255
Slide contact plate (spare)—	
5-inch R. F. gun, model 1897.....	225
6-inch R. F. guns, models 1897 and 1897 M I.....	240
Slide housing spline (spare)—	
5-inch R. F. gun, model 1897.....	225
6-inch R. F. guns, models 1897 and 1897 M I.....	240
Socketguard rear tangent sight:	
8-inch B. L. rifle, model 1888.....	10
Model 1888 M I.....	15
Model 1888 M II.....	20
10-inch B. L. rifle, model 1888.....	50
Model 1888 M I.....	255
Model 1888 M II.....	60
12-inch B. L. rifle, model 1888.....	118
Model 1888 M I.....	123
Model 1888 M 14.....	128
Model 1888 M II.....	133
Worm-wheel (spare), 4-inch recoil mount (Driggs-Schroeder).....	262
Seal stamps, to be issued by Ordnance Department.....	646
Sears:	
Complete—	
4.72-inch R. F. gun (Armstrong).....	268
6-inch R. F. gun (Armstrong).....	375
Complete (spare)—	
4.72-inch R. F. gun (Armstrong).....	270
6-inch R. F. gun (Armstrong).....	278
Spare—	
15-pounder R. F. gun, Driggs-Seabury.....	297
4-inch R. F. gun (Driggs-Schroeder).....	260
Sear springs. <i>See</i> Springs.	
Searchlight outfit, component parts of (submarine mine property).....	337-339
Securing latch, all guns. <i>See</i> Tray back latch.	
Securing latch body. <i>See</i> Tray back latch body.	
Securing latch catch, all guns. <i>See</i> Tray back latch catch.	
Separators, metal, for buffers (spare), 12-inch B. L. mortar carriages.....	216
Setback charts. <i>See</i> Charts.	
Shears:	
For office use not supplied by Ordnance Department.....	576
Maneuvering, issue of, discontinued.....	578
Maneuvering, to be constructed at posts, size of parts, etc.....	578
Shells:	
3.2-inch, special packing box for.....	646
3.2-inch, 13½ pounds band, five-eighths inch from base, to be used in model 1897 guns.....	558
3.2-inch, 13½ pounds band, 1.35 inch from base, to be used only in models 1885 guns.....	558
3.6-inch, 16½ pounds, use of, discontinued.....	555
3.6-inch, special packing box for.....	646
Caliber .30 empty, to be promptly turned into acting ordnance officer.....	592
Gallery practice, caliber .30 not expendable.....	591
May be turned in for resizing, etc.....	591
Loaded, not to be fired until needed for firing.....	553
Not to be stored in powder magazines.....	553

	Page
Shells—Continued.	
Modified cartridge, issued, etc.	62
Small arms, empty, instructions for shipment by acting ordnance officer, etc.	62
Special caliber .30, issued for gallery practice	59
Steel, for seacoast guns—	
4-inch and up to be issued charged with bursting charge only	33
Not to be charged at post	33
Shoes:	
Horse, furnished by Quartermaster's Department	62
Mule, furnished by Quartermaster's Department	62
Shotguns:	
Allowance of, for issue	64
Ammunition. See Ammunition.	
Component parts of, Remington No. 8	66
Remington No. 9	67
Springfield	65
Winchester	65
Issued for hunting purposes west of the Mississippi only	64
Use for guarding prisoners, discontinued	64
Weight of charge for 12-inch gauge	65
Winchester adopted for service use	64
Shot tongs (see also Tongs):	
Allowance of, etc., for—	
6-inch disappearing carriage, L. F., model 1896	20
8-inch disappearing carriage, model 1894	3
10-inch barbette carriage, model 1893	7
12-inch barbette carriage, model 1892	151
12-inch disappearing carriage, L. F., model 1896	19
12-inch B. L. mortar carriage, model 1891	211
Allowance of, etc.	63
Model 1896	215
Shot trucks, list of parts, material, etc., 6-inch disappearing carriage, L. F., model 1896	251
Shoulder piece, wood, etc. (spare):	
4.72-inch R. F. gun mount	271
6-inch R. F. mount (Armstrong)	279
Shrapnel:	
3.2-inch special packing box for	648
3.6-inch special packing box for	644
For—	
Field and siege guns, how packed	344
Siege guns, issued plugged, etc.	344
How to be handled, fuse case not to be opened until before firing, etc.	344
With low-resistance fuse to be handled carefully, etc.	351
Siege battery, 5-inch, composition of	268
Siege batteries, list of personnel to be equipped with sabers	452
Sights:	
1.457-inch Vickers-Maxim automatic gun	574
Bar—	
For 6-inch R. F. gun, model 1900, on barbette carriages, description	349
To be furnished for 6-inch R. F. guns on disappearing carriages	349
Bar and drum, complete (spare)—	
4.72-inch R. F. gun mounts	271
6-inch R. F. mount (Armstrong)	279
Combined bar and telescopic, list of parts, etc., 6-inch R. F. gun, O. D., model 1897	281
Complete bar or open (spare), 5-inch barbette carriage, balanced pillar mount, model 1896	282
Electric-light fittings for 6-inch R. F. gun (Armstrong)	277
Extensible, to be provided for Gatling guns, caliber 0.30, description of, etc.	560
For—	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder), Mark II	286
Mark III	286
6-pounder R. F. gun, Driggs-Seabury, model 1900	286
15-pounder R. F. gun, Driggs-Seabury	286
3.6-inch B. L. rifle	169
4.72-inch R. F. guns (Armstrong)	269
5-inch R. F. gun, O. D., model 1897	294
6-inch R. F. gun (Armstrong) (bar and drum pattern)	277
7-inch B. L. mortar	435

Sights—Continued.

Front—

Page.

Colt's automatic gun, caliber 0.30.....	567
United States magazine rifle and carbine, caliber 0.30, height of axis above bore, etc....	586
6-pounder R. F. gun, Driggs-Seabury, model 1896.....	283
2.95-inch (75 mm.) Vickers-Maxim mountain gun.....	546
3-inch Hotchkiss mountain gun.....	540
3.2-inch B. L. rifle.....	463
5-inch B. L. rifle, siege.....	400
7-inch B. L. howitzers.....	421
Front, list of parts of—	
1.65-inch Hotchkiss mountain gun.....	323
2.95-inch Vickers-Maxim mountain gun.....	323
3-inch Hotchkiss mountain gun.....	323
3.2-inch and 3.6-inch B. L. rifle.....	324
3.6-inch B. L. field mortar.....	325
5-inch B. L. siege rifle.....	324
7-inch B. L. howitzer.....	325
8-inch converted M. L. rifle.....	325
8-inch B. L. rifle.....	327
10-inch B. L. rifle.....	327
12-inch B. L. rifle.....	328
Front axial—	
8-inch B. L. rifle, model 1888.....	10
Model 1888 M I.....	15
Model 1888 M II.....	20
10-inch B. L. rifle, model 1888.....	50
Model 1888 M I.....	55
Model 1888 M II.....	60
Model 1895.....	68
Model 1895 M I.....	66
12-inch B. L. rifle, model 1888.....	118
Model 1888 M I.....	123
Model 1888 M II.....	125
Model 1888 M III.....	138
Model 1895.....	137
Model 1895 M I.....	140
Front and rear, description of—	
3.6-inch B. L. mortars, model 1890.....	528
4-inch R. F. gun (Driggs-Schroeder).....	259-260
Front, special, removable, caliber .30 rifle, issued for use with miniature targets, and only in special cases, etc.....	566
Indicator drum, complete (spare), 15-pounder mount, Driggs-Seabury.....	299
Night—	
Component parts of, for 4.72-inch and 5-inch R. F. gun (Armstrong).....	280
For 8-inch, 10-inch, and 12-inch guns being designed.....	331
List of parts of, for—	
15-pounder R. F. gun.....	330
5-inch R. F. gun.....	331
Open, list of parts of, etc., 5-inch R. F. gun, O. D., model 1897.....	280
Tangent, to be issued on guns mounted on barbette carriages.....	676
Rear—	
6-pounder R. F. gun, Driggs-Seabury, model 1896.....	288
1.65-inch Hotchkiss mountain gun.....	542
2.95-inch (75 mm.) Vickers-Maxim mountain gun.....	547
3-inch Hotchkiss mountain gun.....	540
3.2-inch B. L. rifle.....	464
5-inch B. L. rifles, siege.....	400
Rear, complete (spare), 4-inch recoil mount (Driggs-Schroeder).....	262
Rear, list of parts of—	
1.65-inch Hotchkiss mountain gun.....	323
2.95-inch Vickers-Maxim mountain gun.....	323
3-inch Hotchkiss mountain gun.....	323
3.2-inch and 3.6-inch B. L. rifles.....	324
3.6-inch B. L. field mortar. See Pointing scale.	
5-inch B. L. siege rifle.....	324
7-inch B. L. howitzer (new model).....	325
7-inch B. L. howitzer.....	325

Sights—Continued.	Page
Rear axial—	
8-inch B. L. rifle, model 1888	19
Model 1888 M I	15
Model 1888 M II	20
10-inch B. L. rifle, model 1888	26
Model 1888 M I	25
Model 1888 M II	22
Model 1895	23
Model 1895 M I	27
12-inch B. L. rifle, model 1888	114
Model 1888 M I	123
Model 1888 M I ½	122
Model 1888 M II	123
Model 1895	127
Model 1895 M I	129
Rear (side) brackets, for flat or curved. <i>See</i> Brackets.	
Rear (side), list of parts of—	
8-inch converted M. L. rifle	226
8-inch B. L. rifle	227
10-inch B. L. rifle	227
12-inch B. L. rifle	228
Rear (tangent), 7-inch B. L. howitzer	427-428
Telescopic—	
Allowance of, etc., for issue to howitzer batteries	329, 422
3.2-inch field batteries	464
5-inch siege batteries	467
Description of, model 1896, type "A," for R. F. guns	330
Essential differences in models	329
For—	
6-inch R. F. guns, O. D.	229
8-inch B. L. rifles	21
10-inch B. L. rifles	22
12-inch B. L. rifles	142
List of parts of—	
Model 1896, 1896 M and 1896 M I	328
Model 1897	328
Model 1898 and 1898 M	329
Model 1899, type "A," for R. F. guns	329
Model 1897, issued for field service	330
Provided with sight retainers, etc.	330
Rings for cross wire provided with clamps, etc.	330
Tripod mount for. <i>See</i> Tripod mount.	
To be provided with stop for micrometer screw, etc.	330
United States magazine carbine, caliber .30, model 1896, component parts of	585
Rifle and carbine, caliber .30, component parts of, model 1896	585
Issue of, discontinued	586
Model 1901	585
Manufacture of, discontinued, etc.	586
Model 1902	585
Substituted for 1901 sights, etc.	586
Sight retainer, etc. <i>See</i> Sights, telescopic.	
Silhouettes, special, designed for reduced range targets	588
Silk wipers:	
For use with depression range finders, to be specially kept	307
To be washed when soiled	432
Single trees:	
Ammunition wagon, interchangeable with those of limber siege carriage	461
All 3.2-inch vehicles interchangeable	517
Slide contact bracket. <i>See</i> Bracket.	
Slide contact pin. <i>See</i> Pins.	
Slide contact pin (spare), 5-inch R. F. gun, O. D., model 1897	225
Slide contact plates, complete (spare), 5-inch R. F. gun, O. D., model 1897	225
6-inch R. F. guns, models 1897 and 1897 M I	240
Slide contact rods (spare), 6-inch R. F. gun, O. D., model 1900	241
Slide handle (<i>see also</i> Handle) (spare), 5-inch R. F. gun, O. D., model 1897	226
Slide housing spline screws. <i>See</i> Screws.	

	Page
Slide housing yokes. <i>See</i> Yokes.	
Slide stops. <i>See</i> Stops.	
Slide stops (spare)—	
5-inch R. F. gun, model 1897.....	225
6-inch R. F. gun, models 1897 and 1897 M1.....	240
Sliding block, complete:	
4.72-inch R. F. gun (Armstrong).....	286
6-inch R. F. gun (Armstrong).....	274
Sling carts, large. <i>See</i> Carts.	
Sling chains. <i>See</i> Chains.	
Slings, carbine, not issued.....	682
Slippers, magazine, allowance of, etc., not expendable.....	899
Small arms:	
Can not be sold to retired officers.....	679
Change of finish, etc., prohibited.....	590
Inspectors to direct them turned in if extensive repairs are needed; instructions how to turn in, etc.....	590
Instructions for turning in worn arms in need of repairs, etc.....	589
Lost, etc., by civilian employees, will be charged, etc.....	596
Model of same must be reported on property papers.....	596
Must not be broken up.....	590
Not furnished to acting assistant surgeons.....	592
Not issued to Hospital Corps men, except under certain conditions, etc.....	596
Not to be sold to Indians, etc.....	594
Not to be taken apart by enlisted men, etc.....	590
Officers held peculiarly responsible if care not shown, etc.....	688
Oilers. <i>See</i> Oilers.	
Ordinary repairs only to be made at posts, etc.....	590
To be kept in racks in quarters.....	596
When inspected, paragraph 985, A. R., to be strictly observed.....	599
Snap hooks. <i>See</i> Hooks.	
Soap:	
Castle, issued to infantry troops, with russet-leather equipments.....	627
Crown, issued to infantry troops, with russet-leather equipments.....	627
Harness, not issued to cavalry.....	681
Socket guards, rear tangent sight:	
8-inch B. L. rifle, model 1888.....	10
Model 1888 M1.....	15
Model 1888 M11.....	20
10-inch B. L. rifle, model 1888.....	50
Model 1888 M1.....	55
Model 1888 M11.....	60
12-inch B. L. rifle, model 1888.....	118
Model 1888 M1.....	123
Model 1888 M11.....	128
Model 1888 M11.....	133
Sound telemeters. <i>See</i> Telemeters.	
Spare equipments, list of:	
Siege battery.....	448
Siege batteries.....	448
Spare parts:	
Ammunition wagon, 7-inch B. L. howitzer battery. <i>See</i> 5-inch siege rifle.	
Colt's—	
Automatic machine gun not to be expended until used.....	570
Revolver, caliber .38, allowance of parts for issue to ordnance depots only.....	602-608
6-pounder R. F. guns, American Ordnance Company (Driggs-Schroeder), marks II and III, are not interchangeable, etc.....	288
5-inch siege carriage, list and allowance of, to be carried with battery.....	408
8-inch B. L. rifles, instructions for ordering same.....	22
To be kept on hand at post.....	22
8-inch B. L. rifle and carriages, instructions for making requisitions for.....	43
Unserviceable to be sent to arsenals after replacement.....	43
10-inch B. L. rifles and carriages, instructions for making requisitions for.....	108
When unserviceable to be turned in when replaced.....	108
12-inch carriages, instructions for making requisitions for, etc.....	180
12-inch B. L. mortars and carriages, instructions for making requisitions for.....	216

Spare parts—Continued.

For—

	Page
Artillery store wagon.....	505
Depression position finders not issued.....	507
Forge and battery wagons and artillery store wagons, if issued to Gatling gun batteries.....	564
Guns and carriages, 1.457-inch Vickers-Maxim automatic, issued as needed, etc.....	578
Harness and collar, siege battery, list and allowance of.....	451-452
Night sights, 4.72-inch and 6-inch R. F. guns (Armstrong).....	281
Platform wagon, list of, when issued.....	411
Revolvers—	
Allowance of parts in the table maximum, etc.....	603
Number on hand must be given in requisition.....	603
To be deducted from allowance in tables, etc.....	606
Tripods for Gatling guns.....	564
Siege limber, list of issued when needed.....	400
Illuminating devices for depression position finders, list and allowance of.....	311
Issued for each two guns 1.457-inch Vickers-Maxim automatic gun.....	578
For repairs for 1.65-inch pack outfits, etc.....	580
List and allowance of, for—	
Ammunition siege wagon, to be carried with battery.....	408
Colt's automatic gun, caliber .30.....	560
Revolver, caliber .38, issued to the service.....	602
Caliber .45.....	604
Gatling gun, caliber .50.....	550
6-pounder R. F. gun, American Ordnance Company (Driggs-Seabury), Mark II.....	286
Mark III.....	288
6-pounder Driggs-Seabury mounts.....	292
6-pounder R. F. gun, Driggs-Seabury, model 1898.....	294
Model 1900.....	295
15-pounder mask parapet mounts, Driggs-Seabury.....	290
15-pounder R. F. gun, Driggs-Seabury.....	297
15-pounder and 6-inch R. F. guns, night sights.....	331
1.65-inch Hotchkiss mountain gun (American model).....	533
Paris model.....	532
8.2-inch field battery.....	509
Harness for.....	508
To be carried with battery.....	496
3.2-inch subcaliber tubes.....	465
8.2-inch B. L. rifle, carried on forge and battery wagon.....	463
3.6-inch B. L. mortar carriages, platform.....	539
4-inch recoil mount (Driggs-Schroeder).....	261
4-inch R. F. gun (Driggs-Schroeder).....	260
4.72-inch R. F. guns (Armstrong).....	270
4.72-inch R. F. mounts (Armstrong).....	271
5-inch barbette carriage balanced pillar mount, model 1896.....	222
5-inch R. F. gun, O. D., model 1897.....	225
5-inch B. L. rifle, siege, to be carried with battery.....	399
6-inch barbette carriage, model 1900 (pedestal mount).....	256
6-inch disappearing carriage, L. F., model 1898.....	255
6-inch R. F. guns, O. D., models 1897 and 1897 M1.....	340
6-inch R. F. guns (Armstrong).....	275
6-inch R. F. mount (Armstrong).....	279
8-inch disappearing and barbette carriage.....	42
8-inch B. L. rifles.....	21-22
10-inch barbette and disappearing carriages.....	107-108
10-inch B. L. rifles.....	69-70
12-inch disappearing and barbette carriages.....	179-180
12-inch B. L. rifles.....	142-143
12-inch B. L. mortars.....	305
12-inch B. L. mortar carriages.....	215
Remington shotguns, Nos. 8 and 9.....	607
Smith & Wesson revolvers.....	608
Springfield shotguns.....	606
Subcaliber tubes for—	
4-inch R. F. gun (Driggs-Schroeder).....	261
4.72-inch R. F. guns (Armstrong).....	271

Spare parts—Continued.**List and allowance of, for—Continued.**

Page.

Subcaliber tubes for—Continued.

5-inch B. L. rifle, siege.....	412
5-inch R. F. gun, O. D., model 1897.....	225-226
6-inch R. F. guns, O. D., models 1897.....	241
Model 1900.....	242
6-inch R. F. gun (Armstrong).....	279
7-inch B. L. howitzers.....	429
8-inch B. L. rifle.....	22
10-inch B. L. rifle.....	70
12-inch B. L. rifles.....	143
12-inch B. L. mortars, models 1888, 1890, and 1890 M1.....	206

Swords and sabers.....	619
------------------------	-----

Winchester shotguns.....	605
--------------------------	-----

List and allowance of, to be carried with battery, for—

3.6-inch B. L. mortar.....	528
7-inch B. L. howitzers.....	420
7-inch B. L. howitzer carriages.....	427
7-inch B. L. mortars.....	430
7-inch B. L. mortar carriages.....	440

List of, for—**Colt's revolvers—**

Caliber .38, issued only to ordnance depots.....	602
Caliber .45, issued to ordnance depots only.....	604
2.95-inch mountain gun and carriage, Vickers-Maxim.....	547-548

List of, issued when needed only, for—

3.2-inch B. L. rifle.....	463
3.2-inch field carriage.....	499-500
3.2-inch limber.....	501-502
3.2-inch field caisson.....	502-503
5-inch B. L. rifle, siege.....	399-400
5-inch siege carriage.....	408
7-inch B. L. howitzer, model 1890.....	421
Model 1896.....	421
7-inch B. L. howitzer carriages.....	428
7-inch B. L. mortar.....	430
Forge and battery wagon.....	504-505
Gatling gun carriage.....	562

Limber.....

List of, issued to service for United States magazine rifle, caliber .30, model 1903.....	597
---	-----

Remington shotguns, not interchangeable.....	608
--	-----

Small arms—

Stolen or lost, etc., to be charged on muster and pay rolls.....	589
Supply to be furnished troops leaving posts, etc.....	589
United States magazine rifle, model 1892, no longer issued.....	589
United States magazine rifle and carbine, list in supply table the maximum issued, etc.....	588
List and allowance of, to troops.....	587-588
Unserviceable, 7-inch B. L. howitzer to be turned in when replaced.....	421
12-inch carriages when replaced to be turned in.....	180
12-inch B. L. mortar carriages to be turned in when replaced.....	216
Unserviceable seacoast guns, etc., to be turned in when replaced.....	43

Spindles:All guns. *See* Obturator spindle.Ball washer. *See* Washer.Key. *See* Key.Lock nut. *See* Obturator lock nut.Split ring. *See* Split ring, small.**Split pins (see also Pins):**

Extractor dog pivot (spare), 4.72-inch R. F. gun (Armstrong).....	270
Hinge pin (spare), 4.72-inch R. F. gun (Armstrong).....	270
Operating lever pivot (spare)—	
4.72-inch R. F. gun (Armstrong).....	270
6-inch R. F. gun (Armstrong).....	278
Operating link (spare), 4.72-inch R. F. guns (Armstrong).....	270

	Page
Split rings	
Front—	
5-inch R. F. gun, O. D., model 1897.....	225
6-inch R. F. guns, models 1897 and 1897 M1.....	24
Model 1900.....	241
8-inch B. L. rifles.....	21
10-inch B. L. rifles, models 1898.....	9
Models 1896.....	9
12-inch B. L. rifles, models 1898.....	142
Models 1896.....	143
12-inch B. L. mortars.....	205
Rear—	
5-inch R. F. gun, model 1897.....	225
6-inch R. F. gun, models 1897 and 1897 M1.....	240
Model 1900.....	241
8-inch B. L. rifles.....	21
10-inch B. L. rifles, models 1898.....	9
Models 1896.....	9
12-inch B. L. rifles, models 1898.....	142
Models 1896.....	143
12-inch B. L. mortars.....	205
Small—	
5-inch R. F. guns, model 1897.....	225
6-inch R. F. guns, models 1897 and 1897 M1.....	240
Model 1900.....	241
8-inch B. L. rifles, model 1898.....	21
10-inch B. L. rifles, models 1898.....	9
Model 1896.....	9
12-inch B. L. rifles, models 1898.....	142
Model 1896.....	143
12-inch B. L. mortars.....	205
Sponge covers, list of, issued, etc.....	268
Sponge heads:	
Issued as needed.....	654
With woolen sponges, issued separately.....	492
Not part of sponge and rammer stove, etc.....	452
Sponge (spare), 4-inch recoil mount (Driggs-Schroeder).....	262
Sponges, woolen, issued as needed.....	654
Sponge and rod (spare), 6-pounder Driggs-Seabury mount.....	292
Springs	
Block-locking (spare), 6-pounder R. F. guns, Driggs-Seabury, model 1900.....	285
Clutch (spare), 6-inch disappearing carriage, L. F., model 1898.....	255
Elevating gear (spare), 4-inch recoil mount (Driggs-Schroeder).....	261
Elevating worm (spare), 15-pounder Driggs-Seabury.....	299
Locking (spare), 6-pounder Driggs-Seabury, model 1898.....	284
Main-bolt (spare), 4-inch R. F. guns (Driggs-Schroeder).....	280
Plunger (spare), 15-pounder Driggs-Seabury.....	297
Spare, for—	
10-inch disappearing and barbette carriage.....	167
12-inch disappearing carriages.....	179
12-inch B. L. mortar carriages.....	215
Ammunition box holder (spare), 6-pounder Driggs-Seabury mount.....	292
Ammunition trucks (spare)—	
8-inch disappearing carriage.....	42
10-inch disappearing carriages.....	108
12-inch carriages.....	180
12-inch B. L. mortar carriages.....	216
Brake lever (spare)—	
8-inch disappearing and barbette carriages.....	42
10-inch disappearing and barbette carriages.....	108
12-inch disappearing carriages.....	179
12-inch B. L. mortar carriages.....	215
Buffer (spare)—	
4-inch recoil mount (Driggs-Schroeder).....	261
6-inch disappearing carriage, L. F., model 1898.....	255
8-inch disappearing and barbette carriages.....	42

Springs—Continued.

	Page.
Carrier latch (spare)—	
4.72-inch R. F. guns (Armstrong).....	270
6-inch R. F. gun (Armstrong).....	278
Compression grease cup (spare)—	
8-inch disappearing carriages.....	42
10-inch disappearing carriages.....	108
12-inch disappearing carriages.....	179
12-inch B. L. mortar carriages.....	215
Counter recoil (spare)—	
6-pounder Driggs-Seabury mounts.....	292
15-pounder mount, Driggs-Seabury.....	299
4-inch recoil mount (Driggs-Schroeder).....	261
5-inch barbette carriage balanced pillar mount, model 1896.....	232
Crosshead pawl (spare)—	
6-inch disappearing carriage, L. F., model 1898.....	255
8-inch disappearing carriages.....	42
10-inch disappearing carriages.....	108
12-inch disappearing carriages.....	179
12-inch B. L. mortar carriages.....	215
Extractor (spare)—	
4.72-inch R. F. guns (Armstrong).....	270
6-inch R. F. gun (Armstrong).....	278
Firing leaf (spare)—	
5-inch R. F. gun, O. D., model 1897.....	225
6-inch R. F. guns, models 1897 and 1897 Mt.....	240
6-inch R. F. gun, O. D., model 1900.....	241
Firing pin (spare)—	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder), Mark III.....	288
15-pounder R. F. gun, Driggs-Seabury.....	297
4-inch R. F. gun (Driggs-Schroeder).....	280
4.72-inch R. F. gun (Armstrong).....	270
6-inch R. F. gun (Armstrong).....	278
For—	
Catch retaining mechanism screw open. <i>See</i> Spring-carrier latch.	
Safety stop. <i>See</i> Springs; Safety cam.	
Striker. <i>See</i> Spring firing pin.	
Suspension rods (spare), 5-inch barbette carriage, balanced pillar mounting, model 1896.....	232
Trigger. <i>See</i> Springs, sear.	
Handle-locking (spare)—	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder), Mark II.....	286
4-inch R. F. gun (Driggs-Schroeder).....	290
Main (spare)—	
6-pounder R. F. gun, Driggs-Seabury, model 1898.....	284
Model 1900.....	285
Mogul trace, for siege artillery harness.....	451
Pawl safety latch (spare)—	
8-inch disappearing carriages.....	42
10-inch disappearing carriages.....	108
12-inch disappearing carriages.....	179
12-inch B. L. mortar carriages.....	215
Ratchet ball bearing (spare)—	
8-inch disappearing carriages.....	42
10-inch disappearing carriages.....	108
12-inch disappearing carriages.....	179
12-inch B. L. mortar carriages.....	215
Running out (spare)—	
4.72-inch R. F. gun mounts (Armstrong).....	271
6-inch R. F. mount (Armstrong).....	279
Safety cam (spare)—	
4.72-inch R. F. guns (Armstrong).....	270
6-inch R. F. guns (Armstrong).....	278
Sear (spare)—	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder), Mark II.....	285
Mark III.....	288

Springs—Continued.

Sear (spare)—Continued.

15-pounder R. F. gun, Driggs-Seabury.....	.....
4-inch R. F. gun (Driggs-Schroeder).....	.....
4.72-inch R. F. gun (Armstrong).....	.....
6-inch R. F. gun (Armstrong).....	.....
Shot tray (spare), 10-inch disappearing carriages.....	.....
Slide catch (spare), 6-inch R. F. gun, O. D., model 1900.....	.....
Slide contact plates (spare), 6-inch R. F. gun, model 1897.....	.....
6-inch R. F. guns, models 1897 and 1897 M1.....	.....

Spring covers for oil holes. *See* Covers.Spring pivots. *See* Pivots.Spring rod plugs. *See* Plugs.**Spurs:**

Box, made and sold to officers.....	.....
To be purchased by officers.....	.....

Stamps, steel, for marking azimuth circles, not issued permanently.....

Stencil letters not issued unless called for.....

Stencil outfits:

Components of, and allowance for issue.....
---	-------

For—

Field battery.....	.....
Lettering guns and technical numbers, to be furnished, etc.....	.....
Seacoast posts.....	.....
Siege batteries.....	.....

Stitching horses, issued for post use only.....

Stops:

Crosshead pawl (spare)—

8-inch disappearing carriages.....	.....
10-inch disappearing carriages.....	.....
12-inch carriages.....	.....

Elevating (spare)—

15-pounder mount, Driggs-Seabury.....	.....
6-inch disappearing carriages, L. F., model 1896.....	.....
8-inch disappearing carriages.....	.....
10-inch disappearing carriages.....	.....
12-inch carriages.....	.....

For elevating clamps (spare)—

8-inch disappearing carriages.....	.....
10-inch disappearing carriages.....	.....
12-inch carriages.....	.....

Safety latch (spare)—

6-inch disappearing carriages, L. F., model 1896.....	.....
8-inch disappearing carriages.....	.....
10-inch disappearing carriages.....	.....
12-inch carriages.....	.....

Slide (spare) 6-inch R. F. gun, model 1900.....

Traversing (spare)—

6-inch disappearing carriage, L. F., model 1896.....	.....
8-inch carriages.....	.....
10-inch disappearing and barbette carriages.....	.....
12-inch carriages.....	.....

Stop watches. *See* Time interval recorders.

Store enamel, issued in lieu of asphalt varnish.....

Store trucks. *See* Trucks.**Stores:**

Expendable—

3.2-inch battery not to be expended until used.....	.....
Siege battery not to be dropped until used.....	.....

For signal flags, not issued by Ordnance Department.....

To replace unserviceable and not expendable ones, siege battery, will be issued after submission to inspection of old ones.....

Transferred by order of district commander to regularly invoiced, etc.....

Straps, canteen and haversack, uniform, etc.....

Striker, 4.72-inch R. F. gun. *See* Firing pin complete.**Studs:**

For rope clamp (spare), 6-inch disappearing carriage, L. F., model 1896.....
--	-------

Studs—Continued.

	Page.
Rear stuffing box (spare)—	
6-inch disappearing carriage, L. F., model 1898	255
8-inch disappearing carriages	42
10-inch disappearing carriages	108
12-inch disappearing carriages	179
Screw, for quadrant seats, 12-inch B. L. mortars, issue of	304
Stuffing boxes, hydraulic cylinders, instructions for packing, etc.	671

Subcaliber tubes

(Drill cartridge), allowance of, for—	
6-pounder R. F. guns	394
15-pounder R. F. guns, Driggs-Seabury	397
2.95-inch (75 mm.) Vickers-Maxim mountain gun	547
List of parts, allowance of, etc.—	
8.2-inch B. L. rifle	465
4-inch R. F. gun (Driggs-Schroeder)	261
4.72-inch R. F. guns (Armstrong)	270
5-inch R. F. guns, O. D., model 1897	225
5-inch B. L. rifle, siege battery	411
6-inch R. F. guns, O. D., models 1897, 1897 M1, and 1900	241
6-inch R. F. guns (Armstrong)	278
7-inch B. L. howitzer	429
8-inch B. L. rifles	22
10-inch B. L. rifles	70
12-inch B. L. rifle	143
12-inch B. L. mortar, models 1886, 1890, and 1890 M1	205

Subcaliber tubes and fixtures, to be kept in chest when not in use:

8-inch B. L. rifles	28
10-inch B. L. rifles	70
12-inch B. L. rifles	144
12-inch B. L. mortars	206

Subcales for range finders and azimuth instruments to be reg graduated to one-hundredths of a degree

Submarine mine material, rules and regulations for procuring and accounting	385
---	-----

Supplies

Allowance of, for 8.2-inch battery to be carried on battery wagon	509
Engine, for ordnance machine shop, issued by Ordnance Department	367
Expendable, to be asked for semiannually, etc.	564
Miscellaneous, list and allowance of, for issue to 8.2-inch field battery	510
Ordnance, instructions relative to furnishing, etc.	673-674
Worn out, etc., to be submitted to inspection	590
Saddlers' material, etc., list of, on forge and battery wagon siege battery	447
Target ranges, allowance of	615-616
Supplies and materials, certain kinds, etc., for battery mechanics, issued by Ordnance Department	367

Supply tables:

Cavalry, six months' allowance saddlers' materials	681
Cleaning material—	
Cavalry	630
For 2.95-inch mountain battery, six months' allowance of	550
For 8.2-inch battery, six months' allowance of	510-511
Drawing instruments and material	821
For 2.95-inch mountain battery equipment	549-550
Garlock, packing	861
Material for cleaning and preservation sea-coast armament	359-360
Siege batteries, six months' allowance of	448
Maneuvering material for sea-coast posts	862-863
Miscellaneous material, for—	
2.95-inch mountain battery, six months' allowance of	551
8.2-inch battery, six months' allowance of	512
Siege batteries, six months' allowance of	450
Paints, for 2.95-inch mountain battery, six months' allowance of	550
8.2-inch battery, six months' allowance of	510-511
Siege batteries, six months' allowance of	449
Saddlers' material, six months' allowance of, for—	
2.95-inch mountain battery	551
8.2-inch battery	511-512
Siege batteries	449-450
Targets and supplies	614-615

	Page
Supports, for firing cable (spare):	
6-inch R. F. gun, O. D., model 1897	25
6-inch R. F. guns, models 1897 and 1897 M1	26
Sparcings, for field batteries, proportion in which issued	74
Proportions in which supplied to cavalry	65
Suspension chains. See Chains.	
Suspension chain-fork taper pins. See Pins.	
Switchboards, list of component parts of (submarine mine material)	59
Swivels, carbine, not issued	62
Sword blades. See Blades.	
Swords:	
Cadet, component parts of	60
Issue of, to company musicians, discontinued	60
Musicians and noncommissioned officers, component parts of	60
Principal dimensions of	60
Weights and centers of gravity	62
Swords and sabers	61
List of, issued and sold to service	61
T.	
Tables:	
Correction, not issued by Ordnance Department	23
Range, for all guns, issued by Ordnance Department, allowance of	23
Tanks:	
Oil storage, kind and allowance of, issued to seacoast posts	25
Storage, to be used for oil, etc	25
Taper keys. See Keys.	
Taper pins. See Pins.	
Target frames:	
Allowance of, per target	613
Extra, issued in lots of six	613
Interchangeable parts of	613
Interior issued as needed	614
Not expendable	614
Target material, prices of	617
Target practice, seacoast, no firing to be made with mortars in twelfth zone	670
Target range:	
Post, special requisition for equipment to be made	615
Supplies. See Supplies.	
Targets:	
Allowance of, etc	614
Artillery, land, component parts of	519
For field batteries, allowance of, for issue	519
Parts issued for repairs	519
Combination towing and floating	364
Component parts of locking apparatus, Texas targets	612
Rolling (Cushings)	612-661
Revolving (Texas)	611
Revolving (Improved horizontal axis)	611
Revolving (Laidley), horizontal axis	610
Floating, component parts of	364
For light batteries--	
Allowance of, for issue	518
Component parts of set and material therefor	518
Designation of	518
Iron parts for repairs furnished	519
Iron, gallery	616
New ones not supplied to replace old ones until condemned	614
Not condemned if repairable	614
Paper--	
"X," "Y," "Z," allowance of, etc	616
Expendable	614
List of, issued to service	609
Unit of, issue, etc	613
"C," used on 6 by 12 frames only	613
Principal differences in improved horizontal axis revolving targets	611
Revolving (Texas), dimensions of parts	612
Laidley, vertical axis, component parts of	610

Targets—Continued.	Page.
Seacoast, floating and towing, allowance of.....	363
Skirmish, list of, issued to service.....	609
Sliding, component parts of.....	609
Small arms, list of, issued to service.....	608
To be set up, etc., by Quartermaster's Department.....	616
Towing, component parts of.....	364
Wooden carriage frames for sliding targets, not issued (spare).....	610
Supplies and material, allowance of.....	615-616
Targets and target material to be accounted for by acting ordnance officers of posts.....	617
Telemeters, sound:	
Allowance of, for issue to Howitzer batteries.....	422
Siege batteries.....	401
Telescopic sights. See Sights.	
Allowance of, for field and siege batteries.....	316
Testing sets, components of.....	391
Thread, for breechblocks, 6-inch R. F. gun, O. D. model 1900, cut in breech, etc.....	289
Thermometers, not issued by Ordnance Department.....	316
Throttling bar bolts. See Bolts.	
Thrust elevating worm ball bearings, complete (spare), 16-pounder mount, Driggs-Seabury.....	299
Thrust bearings:	
Complete—	
10-inch B. L. rifle, model 1895.....	63
Model 1896 M1.....	66
12-inch B. L. rifle, model 1895.....	136
12-inch B. L. rifle, model 1896 M1.....	140
Spare, 12-inch B. L. rifles, models 1895.....	143
For worm shaft (spare), 10-inch B. L. rifles, models 1895.....	70
Tide lines, no longer issued.....	632
Time interval recorders:	
Allowance of.....	321
For issue to, howitzer batteries.....	422
Siege batteries.....	401
Tompon and muzzle covers combined, list of, supplied, etc.....	368
Tompions:	
Expanding (spare)—	
4.72-inch R. F. gun (Armstrong).....	270
6-inch R. F. guns (Armstrong).....	278
List of, supplied, etc.....	369
Tongs, shot, allowance of, for issue.....	678
Tool box:	
Contents of, for—	
A. B. C. D., submarine.....	390
7-inch howitzer carriage, model 1899, and howitzer models 1890 or 1898.....	431
For oil engines, contents of (submarine).....	386
Siege ammunition wagons, contents of.....	407
Tool chest:	
Contents of, for—	
4.72-inch R. F. gun, and mount.....	272
6-inch R. F. gun and mount (Armstrong).....	280
Tool and implement box, contents of, for 4-inch R. F. guns and mount (Driggs-Schroeder)....	262
Tools:	
Blacksmith, for siege battery.....	451
Carpenter, not supplied by Ordnance Department.....	363
For post mechanics not issued by Ordnance Department.....	676
Carpenter and wheelwright, siege batteries (<i>see also</i> 3.2-inch battery).....	448
Components of set, for mechanics, etc., at posts not equipped with power machine shop....	366
Decapping, components of set, for—	
4-inch R. F. case.....	262
4.72-inch and 6-inch R. F. guns (Armstrong).....	261
Decapping and cleaning, 1-pounder subcaliber ammunition, for—	
4-inch R. F. gun (Driggs-Schroeder).....	262
5-inch R. F. gun, O. D., model 1897.....	226
6-inch R. F. guns, O. D.....	242
8-inch B. L. rifles.....	23
10-inch B. L. rifles.....	70
12-inch B. L. rifles.....	144

Tools—Continued.	
Decapping and cleaning, for 1-pounder subcaliber ammunition, for 4.72-inch and 6-incl.	
R. F. guns (Armstrong)	3
Decapping and priming, list of, etc., for—	
6-pounder R. F. guns.....	3
15-pounder R. F. guns, Driggs-Seabury	11
To be turned in for repairs and not replaced, etc.....	11
For—	
8-inch B. L. rifles and carriages, unserviceable, to be sent to arsenals when replaced....	4
12-inch B. L. rifles and carriages, unserviceable, to be turned in when replaced.....	4
12-inch B. L. rifles, model 1900.....	4
12-inch disappearing carriage, L. F., model 1901.....	11
Crusher gauge, copper covered.....	11
Fixed crusher gauge (large).....	11
Small	11
Internal crusher gauge (loose)	11
Small	11
Making repairs to rifle or carbine, component parts of kit.....	11
Removing old vent pieces, light 12-pounder to be obtained from Rock Island Arsenal..	11
Replacing recoil plates of revolvers, to be supplied to ordnance depots.....	61
Swasey depression position finder, type "A," list constituting set, etc.....	71
Lewis depression position finder, types A and B	31
List of, for removing old vent pieces, light 12-pounder.....	11
For repairs of Smith & Wesson revolver, caliber .38.....	71
To be carried on artillery store wagon 3.2-inch battery	31
Fuse. See Fuse tools.	
Pioneer, list of, for 2.95-inch mountain battery.....	11
Re-forming, components of set for, 4.72-inch R. F. Gun (Armstrong).....	11
For 4.72-inch R. F. gun (Armstrong), not issued to the service.....	11
Reloading—	
Caliber .30 for gallery practice issue—	
Allowance of, for.....	11
Component parts of set	11
To be turned in for repairs and not replaced, etc	11
1.65-inch mountain gun, differences between foreign and American make, etc	11
Components of set for—	
1.65-inch mountain gun	11
Remington shotgun	11
Springfield shotgun.....	11
Winchester shotgun	11
For—	
Mountain guns, not issued to the service.....	11
Revolvers, not issued.....	11
Shotguns, allowance of, for issue to the service.....	11
To be turned in for repairs and not replaced, etc	11
Saddlers, list and allowance of, for issue to—	
Cavalry	11
Siege batteries (see also 3.2-inch battery)	11
Sets for depression position finders, list of.....	11
Smith's, furnished for portable forge and forge and battery wagon only.....	11
Unserviceable for, to be turned in when replaced—	
10-inch B. L. rifles and carriages.....	11
12-inch B. L. rifles and carriages.....	11
Unserviceable, to be turned in when replaced	11
Tools and accessories, list of, for—	
Artillery store wagon (new model).....	11
15-pounder guns and mount, Driggs-Seabury.....	11
Tools and equipments:	
List of, for—	
6-inch B. L. rifle, siege, and carriage	41
7-inch B. L. howitzer and carriage	4
Special, carried on forge and battery wagon, siege battery.....	41
Tools and implements:	
For earlier model carriages, to be taken up on property returns	11
List of, issued with each Gatling gun, caliber .30.....	11
On siege and battery wagon, siege battery	11
Requisition for, how to be made.....	11

	Page.
Tools, implements, and equipments, list of, for 3.2-inch field battery	505-506
Tools and machines for seacoast fortifications.....	364
Towing targets. <i>See</i> Targets.	
Towing lines, issued for towing targets, allowance of.....	364
Truce ropes, allowance of, for seacoast posts, etc.....	384
Truces, wire, adopted for future issue	514
Transfer of—	
Guns, carriages, range finders, etc., not to be ordered by artillery district commanders.....	367
Stores may be ordered by artillery district commanders	367
Transits, engineer, not issued by Ordnance Department.....	319
Translating crank (spare):	
8-inch B. L. rifles	22
10-inch B. L. rifles, models 1888.....	69
12-inch B. L. rifles, models 1888.....	142
Translating roller (spare):	
8-inch B. L. rifles	21
10-inch B. L. rifles, models 1888.....	69
12-inch B. L. rifles, models 1888.....	142
12-inch B. L. mortars	205
Translating stud (spare):	
8-inch B. L. rifles	22
10-inch B. L. rifles, models 1888.....	69
12-inch B. L. rifles, models 1888.....	142
Transportation:	
Boxes for—	
Arms, ordnance stores, etc., to be sealed and stamped, etc.....	645
Ocean transportation to be strapped with wire, etc	646
Supplies in quantities less than given in tables, etc.....	653
Breech mechanism to be packed to prevent moving	646
Detail of loads for 2.95-inch mountain gun and carriage, Vickers-Maxim.....	548
If seal is broken, loss charged to carrier, etc.....	646
Name of invoicing officer, arsenal, weight, etc., to be marked on box, package, etc	646
Of arms, officers held responsible for secure packing, etc.....	645
3.6-inch B. L. mortar battery	529
Officer who turns over supplies in good condition relieved, etc., board of survey to act on goods damaged, etc.....	645
Ordnance stores beyond seas to be boxes of 150 pounds, etc.....	645
Stores turned over to Quartermaster's Department to be accompanied by invoices, etc.....	646
Travelling stops. <i>See</i> Stops.	
Tray, complete, list of parts of:	
8-inch B. L. rifle, model 1888.....	8
Model 1888 M I	18
Model 1888 M II.....	17
10-inch B. L. rifles, model 1888.....	48
Model 1888 M I	58
Model 1888 M II.....	58
Model 1895	62
Model 1895 M I	66
12-inch B. L. rifle, model 1888	116
Model 1888 M I	121
Model 1888 M 14.....	126
Model 1888 M II.....	131
Model 1895	136
Model 1895 M I	139
12-inch B. L. mortar, model 1886.....	187
Model 1886-1890 M I	197
Model 1890 (steel).....	192
Model 1890 M I (steel)	202
Tray ball bearing, complete:	
10-inch B. L. rifle, model 1895 M I	66
12-inch B. L. rifle, model 1888	116
Model 1888 M I	121
Model 1888 M 14.....	126
Model 1888 M II.....	131
Model 1895	136
12-inch B. L. rifle, model 1895 M I	139

	Page.
Tray ball bearing (spare):	
10-inch B. L. rifles, models 1895.....	14
12-inch B. L. rifles, models 1888.....	14
Models 1895.....	145
Tray back latch, complete, list of parts of:	
8-inch B. L. rifle, model 1888.....	14
Model 1888 M I.....	14
Model 1888 M II.....	14
10-inch B. L. rifle, model 1888.....	14
Model 1888 M I.....	14
Model 1888 M II.....	14
12-inch B. L. rifle, model 1888.....	14
Model 1888 M I.....	14
Model 1888 M I 1/4.....	14
Model 1888 M II.....	14
12-inch B. L. mortar, model 1886.....	14
Model 1890 (steel).....	14
Model 1890 M I (steel).....	14
Tray back latch (spare):	
8-inch B. L. rifles.....	21
10-inch B. L. rifles, models 1888.....	69
12-inch B. L. rifles, model 1888.....	142
12-inch B. L. mortars.....	206
Tray back latch catch (spare):	
10-inch B. L. rifles, models 1888.....	69
12-inch B. L. rifles, models 1888.....	142
Tray latch, complete, list of parts of:	
8-inch B. L. rifle, model 1888.....	8
Model 1888 M I.....	15
Model 1888 M II.....	15
10-inch B. L. rifle, model 1888.....	4
Model 1888 M I.....	56
Model 1888 M II.....	56
12-inch B. L. rifle, model 1888.....	114
Model 1888 M I.....	121
Model 1888 M I 1/4.....	128
Model 1888 M II.....	131
Tray latch, complete (spare):	
8-inch B. L. rifles.....	21
10-inch B. L. rifles, models 1888.....	69
12-inch B. L. rifles, models 1888.....	142
Tray latch (spare):	
10-inch B. L. rifles, models 1895.....	69
12-inch B. L. rifles, models 1895.....	143
12-inch B. L. mortars.....	206
Tray-latch lock bolt (spare):	
10-inch B. L. rifles, models 1895.....	69
12-inch B. L. rifles, models 1895.....	143
Tray-latch lock-bolt spring (spare):	
10-inch B. L. rifles, models 1895.....	69
12-inch B. L. rifles, models 1895.....	143
Tray-latch operating stud (spare):	
10-inch B. L. rifles, models 1895.....	70
12-inch B. L. rifles, models 1895.....	143
Tray-latch spring (spare):	
10-inch B. L. rifles, models 1895.....	69
12-inch B. L. rifles, models 1895.....	143
Tray lock, complete (list of parts):	
8-inch B. L. rifle, model 1888.....	9
Model 1888 M I.....	13
Model 1888 M II.....	13
10-inch B. L. rifle, model 1888.....	48
Model 1888 M I.....	53
Model M II.....	58
12-inch B. L. rifle, model 1888.....	117
Model 1888 M I.....	122
Model 1888 M I 1/4.....	127
Model 1888 M II.....	131

Tray lock:**Bolt (spare)—**

8-inch B. L. rifles	22
10-inch B. L. rifles, models 1888	69
12-inch B. L. rifles, models 1888	142

Cam, all guns. See Tray lock lever.

Latch, complete, 12-inch B. L. mortar, model 1886-1890 M1	198
---	-----

Lever (spare)—

8-inch B. L. rifles	22
10-inch B. L. rifles, models 1888	69
12-inch B. L. rifles, model 1888	142

Lever pivot (spare)—

8-inch B. L. rifles	22
10-inch B. L. rifles, model 1888	69
12-inch B. L. rifles, model 1888	142

Link (spare)—

8-inch B. L. rifles	22
10-inch B. L. rifles, model 1888	69
12-inch B. L. rifles, model 1888	142

Link pin (spare)—

8-inch B. L. rifles	22
10-inch B. L. rifles, model 1888	69
12-inch B. L. rifles, model 1888	142

Pin (spare)—

8-inch B. L. rifles	22
10-inch B. L. rifles, model 1888	69
12-inch B. L. rifles, model 1888	142

Pin nut (spare)—

10-inch B. L. rifles, model 1888	69
12-inch B. L. rifles, model 1888	142

Pin nut pin (spare)—

10-inch B. L. rifles, model 1888	69
12-inch B. L. rifles, model 1888	142

Tray spring bolt (spare):

8-inch B. L. rifles	21
10-inch B. L. rifles, model 1888	69
12-inch B. L. rifles, model 1888	142
12-inch B. L. mortars	206

Shoe (spare)—

8-inch B. L. rifles	22
10-inch B. L. rifles, model 1888	69
12-inch B. L. rifles, model 1888	142
12-inch B. L. mortars	206

Shoe screw (spare)—

8-inch B. L. rifles	22
10-inch B. L. rifles, model 1888	69
12-inch B. L. rifles, model 1888	142
12-inch B. L. mortars	206

Spring (spare)—

8-inch B. L. rifles	21
10-inch B. L. rifles, model 1888	69
12-inch B. L. mortars	206

Trays, loading, for 12-inch B. L. mortars no longer issued	218
--	-----

Trigger, 4.72-inch guns. See Sear.**Tripods for—**

Colt's automatic gun, caliber .30, component parts of	568
Gatling guns, component parts of	564
Tripod mount for telescopic sights, for instruction purposes, to be issued	382

Tripoli:

Allowance of seacoast posts	362
Not issued to infantry troops	628

Trucks:

Store, allowance of, for issue	377
List of principal parts, etc	377

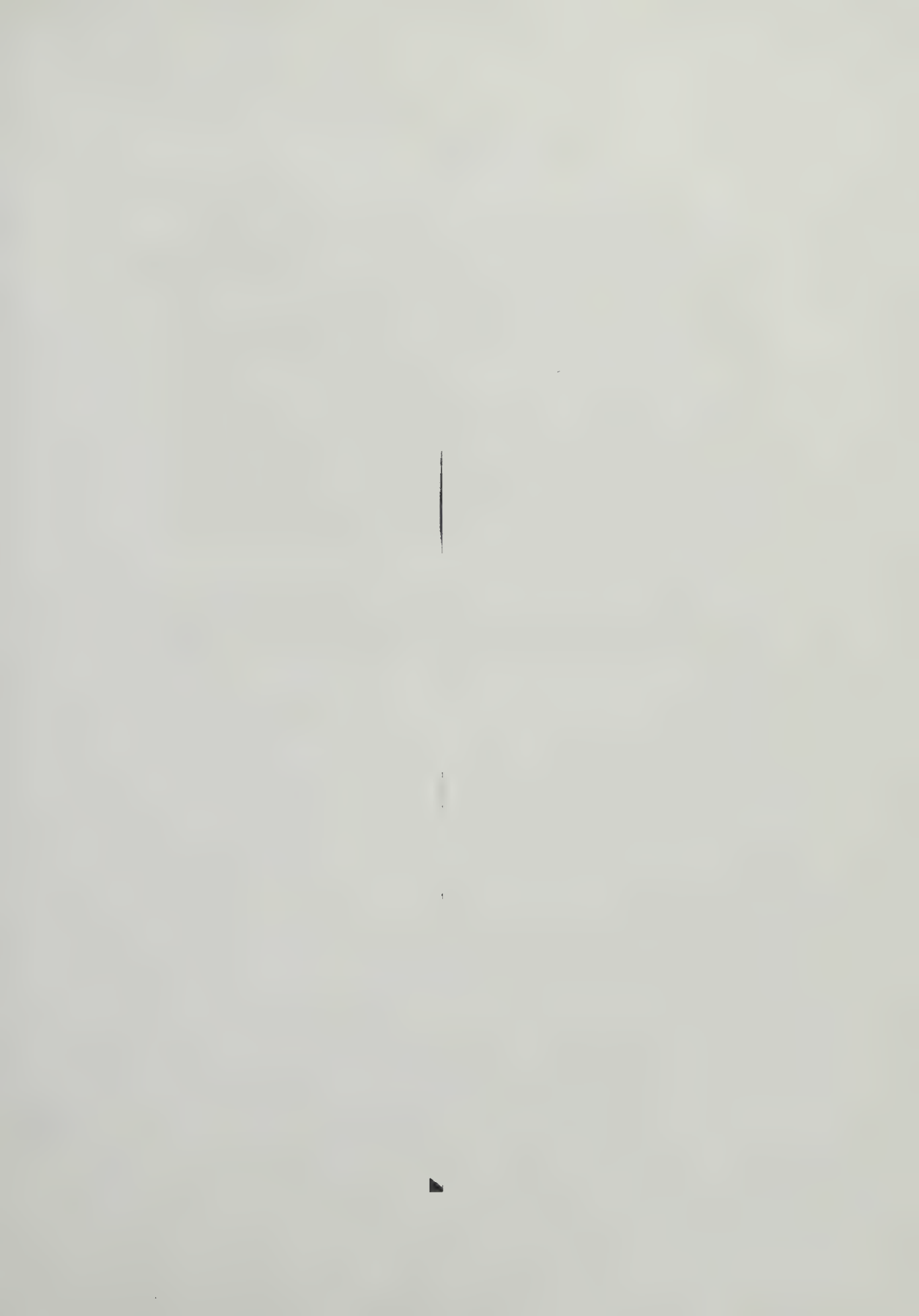
Twisted hooks. See Hooks.

V.

	Page
Varnish, asphalt, issue discontinued.....	1
Vaseline, issue of, discontinued.....	3
Valve key (see also Key):	
Bolt. See Bolt.	
Complete (spare), 4.72-inch R. F. gun mount.....	57
Velocity, muzzle:	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder), Mark II.....	24
6-pounder R. F. gun, Driggs-Seabury, model 1896.....	26
15-pounder R. F. gun, Driggs-Seabury.....	26
1.457-inch Vickers-Maxim mountain gun.....	37
1.65-inch Hotchkiss mountain gun.....	37
2.95-inch (75 mm.) Vickers-Maxim mountain gun.....	34
3-inch Hotchkiss mountain gun.....	34
3.2-inch B. L. rifle, model 1885.....	45
Model 1897.....	47
3.6-inch B. L. rifle, model 1891.....	51
3.6-inch B. L. mortar, model 1890.....	55
4-inch R. F. gun (Driggs-Schroeder).....	24
4.72-inch R. F. gun (Armstrong).....	
40 calibers.....	26
45 calibers.....	24
50 calibers.....	26
5-inch R. F. gun, O. D., model 1897.....	21
5-inch B. L. rifle, model 1890.....	34
5-inch B. L. rifle, siege, models 1898, 1898 MI.....	37
6-inch R. F. gun (Armstrong).....	17
6-inch R. F. gun, O. D., model 1900.....	17
7-inch B. L. howitzer, model 1890.....	41
Model 1898.....	41
7-inch B. L. mortar, model 1892.....	43
6-inch R. F. guns, model 1897 and 1897 MI.....	23
8-inch B. L. rifle, model 1898.....	11
Model 1898 MI.....	16
Model 1898 MII.....	21
10-inch B. L. rifle, model 1898.....	5
Model 1898 MI.....	5
Model 1898 MII.....	61
Model 1895.....	64
Model 1895 MI.....	67
12-inch B. L. rifle, model 1898.....	119
Model 1898 MI.....	124
Model 1898 M I.....	125
Model 1898 MII.....	134
Model 1895.....	137
Model 1895 MI.....	141
12-inch B. L. mortar, model 1896, cast iron, steel hooped.....	133
Model 1896-1890 MI.....	199
Model 1890 (steel).....	194
Model 1890 MI (steel).....	204
Velocity, terminal:	
15-pounder R. F. gun, Driggs-Seabury.....	226
4.72-inch R. F. gun (Armstrong).....	
40 calibers.....	263
45 calibers.....	264
50 calibers.....	265
5-inch R. F. gun, O. D., model 1897.....	221
6-inch R. F. gun (Armstrong).....	273
6-inch R. F. gun, O. D., models 1897 and 1897 MI.....	235
Model 1900.....	236
Vent covers (spare):	
8-inch B. L. rifles.....	22
10-inch B. L. rifles, models 1888.....	69
Models 1895.....	69
12-inch B. L. rifles, models 1888.....	142
Models 1895.....	143
12-inch B. L. mortars.....	205
Vent pieces, light 12-pounder; requisition must give name of manufacturer, etc.....	654
Vent plugs. See Plugs.	

Wagons:	W.	Page.
Ammunition—		
7-inch B. L. howitzer battery (<i>see also</i> 5-inch siege rifle)		427
For siege trains, capacity of		406
List of parts, material, nomenclature, etc		406-407
To be replaced by caissons		398
To be used as implement wagons		398
Artillery store—		
7-inch B. L. howitzer battery. <i>See</i> 3.2-inch B. L. rifle battery.		
For Gatling gun batteries		564
Siege batteries		411
List of parts, material, nomenclature, etc		488-497
New model, list of essential changes from old model		497-498
Body, to be turned in if seriously damaged, etc		505
Forge and battery—		
For—		
Gatling-gun batteries		564
7-inch B. L. howitzer battery. <i>See</i> 3.2-inch B. L. rifle battery.		
Siege batteries		411
Issued with 1.457-inch Vickers-Maxim mountain-gun battery		578
List of parts, material, nomenclature, etc., 3.2-inch field battery		484-488
Implement for—		
5-inch siege battery		410
7-inch howitzer battery		414
Siege battery, list of equipments to be carried on same		410
Platform—		
7-inch B. L. howitzer battery (<i>see also</i> 5-inch siege rifle)		429
Siege battery		410
List of parts, material, nomenclature, etc		410-411
Standard—		
Furnished siege trains by Quartermaster's Department		398
To be furnished for 7-inch howitzer battery		414
Waist belt, with saber attachments, issued in lieu of saber belt		547
Washers		
Balata (spare) for—		
8-inch carriages		48
10-inch carriages		108
12-inch carriages		180
Belleville spring for—		
Clamp of training gear (spare), 4-inch R. F. gun mounts		271
Clamp, 6-inch R. F. mount (Armstrong)		279
Elevating gear, 4.72-inch R. F. gun mounts		271
6-inch R. F. mount (Armstrong)		279
Copper for crusher gauges, number issued		372
For—		
Air-hole plugs (spare), 4-inch recoil mount (Driggs-Schroeder)		261
Air and filling plugs (spare), 15-pounder mounts, Driggs-Seabury		299
Filling-hole plugs (spare), 4-inch recoil mount (Driggs-Schroeder)		261
Oscillating slide (spare), 15-pounder mount, Driggs-Seabury		299
Insulating (spare), 4.72-inch R. F. guns (Armstrong)		276
6-inch R. F. guns (Armstrong)		278
Leather, bolt for valve key (spare)—		
4.72-inch R. F. gun mounts		271
6-inch R. F. mount (Armstrong)		279
Controlling ram (spare), 6-inch R. F. mount (Armstrong)		279
Cylinder plug (spare)—		
4.72-inch R. F. gun (mount)		271
6-inch R. F. mount (Armstrong)		279
Filling plug (spare)—		
4.72-inch R. F. gun mounts		271
6-inch R. F. mount (Armstrong)		279
Plug drain cylinder (spare), 6-inch R. F. mount (Armstrong)		279
Tank plug (spare)—		
4.72-inch R. F. gun mount		271
6-inch R. F. mount (Armstrong)		279

Washers—Continued.	Pg.
Spindle ball (spare)—	
5-inch R. F. gun, model 1897.....	20
6-inch R. F. guns, models 1897 and 1897 M1.....	20
Model 1900.....	20
Upper antifriction, complete (spare), 4-inch recoil mount (Driggs-Schroeder).....	20
Water colors. <i>See</i> Material.	
Wedges, target frame, are not issued with spare parts of frame.....	21
Weights	
6-pounder R. F. gun, American Ordnance Company (Driggs-Schroeder), Mark II.....	22
Mark III.....	22
6-pounder R. F. guns, Driggs-Seabury, model 1898.....	22
Model 1900.....	22
15-pounder R. F. gun (Driggs-Seabury).....	22
1.457-inch Vickers-Maxim mountain gun.....	22
1.65-inch Hotchkiss mountain gun.....	22
2.95-inch (75 mm.) Vickers-Maxim mountain gun.....	22
3-inch Hotchkiss mountain gun.....	22
3.2-inch B. L. rifle, model 1885.....	22
Model 1897.....	22
3.2-inch caisson.....	22
3.2-inch carriages.....	22
3.2-inch carriages, average per horse, etc.....	22
3.2-inch forge and battery wagon.....	22
3.2-inch limber.....	22
3.6-inch B. L. rifle, model 1891.....	22
3.6-inch B. L. mortar, model 1890.....	22
4-inch R. F. gun (Driggs-Schroeder).....	22
4.72-inch R. F. gun (Armstrong)—	
40 calibers.....	22
45 calibers.....	22
50 calibers.....	22
5-inch B. L. rifle, siege, model 1890.....	22
Model 1898.....	22
5-inch R. F. gun, O. D., model 1897.....	22
5-inch siege rifle carriage, models 1898, 1898 M.....	22
6-inch R. F. gun (Armstrong).....	22
6-inch R. F. gun, O. D., Models 1897 and 1897 M1.....	22
Model 1900.....	22
7-inch B. L. howitzer, model 1890.....	22
Model 1898.....	22
7-inch B. L. howitzer carriage, model 1893.....	22
Model 1899.....	22
7-inch B. L. howitzer limber.....	22
7-inch B. L. mortar, model 1892.....	22
8-inch B. L. rifle, model 1888.....	22
Model 1888 M1.....	22
Model 1888 M11.....	22
10-inch B. L. rifle, model 1888.....	22
Model 1888 M1.....	22
Model 1888 M11.....	22
Model 1895.....	22
Model 1895 M1.....	22
12-inch B. L. rifle, model 1888.....	22
Model 1888 M1.....	22
Model 1888 M11.....	22
Model 1888 M11.....	22
Model 1895.....	22
Model 1895 M1.....	22
12-inch B. L. mortar, model 1886, cast iron, steel hooped.....	22
Model 1886-1890 M1.....	22
Model 1890 (steel).....	22
Model 1890 M1 (steel).....	22
Of—	
Limber, siege.....	400
Pack outfit, Colt's automatic gun, caliber .30.....	571-572
Pack saddle, 1.65-inch Hotchkiss mountain gun.....	584



Weight—Continued.

Page.

Principal of—

1.65-inch mountain gun carriage	534
3.2-inch carriage, limber, caisson, etc	470
Artillery store wagon	471-472
Weights and measurements, 1.65-inch Hotchkiss mountain gun	534

Wheels:

3.2-inch limber, used for limber, caisson, forge and battery wagon only	502
Kind used for siege battery vehicles	452
Wheel, ratchet (spare), 15-pounder mount, Driggs-Seabury	299
Whips, allowance of, for field battery	517
Whistler plotting board. <i>See</i> Plotting boards.	
Whistles will be placed upon swords, upon request, etc	618
Wingnut, all guns. <i>See</i> Rotating crank lock handle.	

Wrenches:

Double, $\frac{1}{4}$ -inch and $\frac{1}{2}$ -inch nuts, 12-inch disappearing carriage, L. F., model 1901	184
Monkey, synonymous with "screw wrench"	677
Screw, synonymous with "monkey"	677
Socket and screw-driver, for traveling roller, bolts, and rock screws, 12-inch disappearing carriage, L. F., model 1901	184
Box, 1-inch openings, issued with certain 12-inch mortar carriages only	218
For base plugs, for siege and seacoast shot and shell	351
Fuse. <i>See</i> Fuse wrenches.	
Issue of, to field batteries discontinued	505
Obturator nut, two sizes issued for 10-inch B. L. rifles	118

Y.Yale locks (spare). *See* Locks.

Yale-Weston triplex pulley blocks, large tonnage, not issued permanently, but loaned to seacoast posts	853
Yoke, pivot, ball-bearing, complete (spare), 15-pounder mount, Driggs-Seabury	299
Yokes, slide housing (spare), 6-inch R. F. gun, O. D., model 1900	241

O

CPSIA information can be obtained
at www.ICGtesting.com
Printed in the USA
LVOW04s0144290617

539755LV00020B/675/P



9 781149 774038



650-BAC-369



9 781149 774038